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Vol. CXXXIII. No. 3434 SEPTEMBER 17, 1943 6d. WEEKLY

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ELECTRICAL REVIEW

September 17, 1943

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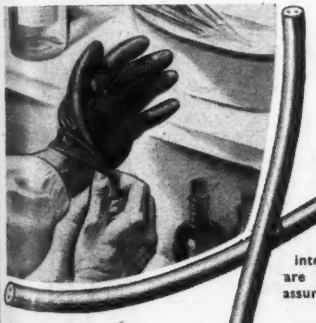

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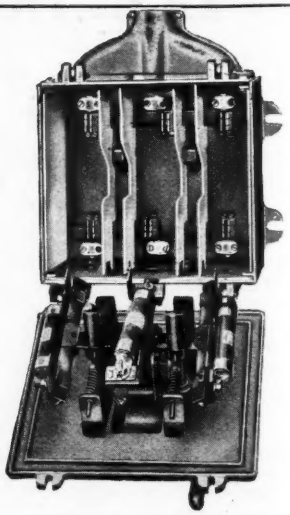

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXXXIII. No. 3434. SEPTEMBER 17, 1943 6d. WEEKLY

Improved Understanding

Instruction for Commercial Staffs

So much has been said and written regarding the necessity for engineers to have some knowledge of the economics (or, more plainly, the £ s. d.) of their industry that many people are now convinced that in future no training scheme will be considered effective which neglects this aspect. On the other hand, little is said of the necessity for those on the commercial staffs of engineering concerns to have something more than a vague conception of the nature of their employers' products. There are, of course, commercial engineers who successfully ride both horses, but apart from these there are many thousands of people who should be encouraged to get to know something more than the names of the things with which they are dealing.

In the course of years it is possible for an intelligent man or woman to pick up a good deal of knowledge of engineering methods and products, but how much better it would be if they could be given some special systematic form of training. Their interest in their work would be considerably increased and they would be of much greater value to their firms.

Form of Tuition

Questions naturally arise as to the form and extent of the training and the responsibility for it. It is not suggested that it should take the form of engineering courses; it should be sufficient to take examples of machines and devices, demonstrate their construction and operation, and give examples of their application. That means that it would have to be specific rather than general, related to particular machines or classes of machines, although the way in which these fitted into the general scheme would be outlined. Obviously, no public educational institution could undertake this unless it were assured of the attendance of sufficient numbers of people from a single large works to form a regular class. And then the instructors would have to be supplied from the works. This suggests that after all the best way of handling the matter would be to keep it in the works, the whole business being in the hands of the firm. Moreover, this would provide a better assurance of attendance sufficient to justify the trouble involved.

Business Inquiries

It might be objected that this instruction might give some employees an exaggerated idea of their functions; that they might start giving "half-baked" advice and misleading information off-hand on the telephone. We do not think that there is much fear of such an excess of zeal. Instruction should aim at enabling them to understand what was being talked about and give intelligent answers before passing on inquirers to the technical men.

In the supply industry, knowledge of the general principles of power station work, the operation of appliances and the structure of tariffs would prove particularly useful, for every employee is to some extent a salesman in direct contact with the customers—the public. We have on

previous occasions urged that meter readers should be capable of answering housewives' questions in a practical way, but there is no reason why they should be the only members of the staff able to do so.

Not only the rank and file would benefit from such tuition. There are many men in the higher flights who have been brought into electrical businesses on account of other than electrical qualifications. It is expedient and necessary that they, too, should at least know the technical rudiments of their business.

Educational Needs

ADMIRABLE as are most of the views expressed in the recent White Paper in regard to technical education, their effective worth rests upon certain assumptions. The first is that there will be teachers adequate in quality as well as in quantity for the task. More will be known about this when the McNair Report appears. Next, that equipment will be of the highest standard and well abreast of engineering developments. After that come buildings designed suitably for modern requirements. These requisites are emphasised in the statement of policy issued by the Institution of Mechanical Engineers after a study of the Board of Education's proposals. This statement (an abstract of which appears in this issue) may be conveniently read in conjunction with the I.E.E. Report on the subject published earlier this year, the influence of which is apparent in the White Paper's recommendations.

A Pipe Dream?

THERE is a further assumption without which these educational aspirations are likely to remain the baseless fabric of a vision, and that is that increased funds shall be made available. The expenditure necessary will undoubtedly yield a high national dividend, even in the most material sense. Yet the I.Mech.E. appears to have reason for its concern on account of the apparent lack of appreciation on the part of the Board of Education of "the close relationship between technical education and our industrial survival after the war." Generous financial provision is required for the immediate post-war years and cannot, without grave consequences, be indefinitely postponed.

Graduates

THE claims of graduates to be allowed opportunities for gaining responsibility in order that they may be qualified for corporate membership of the senior engineering institutions are handsomely acknowledged in the statement of policy referred to. It says: "Experience during the present war has shown the value of the graduate engineer by reason of his versatility and capacity to tackle new and novel work in a creditable manner, and it is reasonable to suppose that the future demand for such men will be appreciably greater than in pre-war times."

Engineering Economics

RECOGNITION of the importance of engineering economics in technical training has been shown by London University in inviting Sir Frank Gill to give a course of three lectures on the subject, the first next Tuesday (see Forthcoming Events). The wide interest aroused by the re-opening of this question in the paper read by Sir Frank before the I.E.E. last Session is no doubt shared by many who were on that occasion unable to take advantage of the opportunity to hear the reasoned views of a protagonist of many years standing.

Australian Restrictions

AN interesting point about a regulation in Australia restricting the retail sale of heating and cooking appliances is that the onus is placed on the purchaser to obtain a permit. The supply of articles by a distributor to a retail house for resale is not affected. Under the Australian regulation, which has been made in order to conserve electricity, gas and fuel, and the iron and steel and skilled man-power involved in the production of the appliances, a supplier must not sell any prescribed article unless the prospective purchaser can produce a permit from the Department of War Organisation of Industry. Such permits to purchase (including hire, etc.) will not be issued if there is an alternative system of heating or cooking available and the fact that greater economy or efficiency would result will not be regarded as sufficient justification. This method of approach is no doubt favoured as it enables deserving cases to be dealt with easily.

Factory Distribution

The Need for a Flexible Lay-out

By J. G. Craven, M.I.E.E.,
and
J. Collins, A.M.I.E.E.

OVER four years ago the opening paragraph of an article in the *Electrical Review** emphasised "the need to plan the electrical distribution lay-out as an integral part of the general factory scheme" in order that it might meet the very varied demands likely to be made upon it through changes in production lay-out. This statement has been proved up to the hilt in countless new factories erected during the war, and in none more so than in the small arms ammunition plant now described.

This is a converted weaving shed, the wooden roof trusses of which, supported by cast-iron pillars of circular section, still remain. There are two blocks to the factory. Block "A" is roughly rectangular and averages 185 ft. long by 116 ft. wide; it is 10 ft. 6 in. in height to the roof trusses. Block "B" is a two-storey building measuring 62 by 56 ft. for heavy machines on the ground floor; the works canteen is situated on the first floor.

For the first estimate a production lay-out embodying ninety-eight motors and utilising mainly line-shaft drives for the various machines was the basis. The electrical scheme was laid out around main and sub-main high-rupturing-capacity multi-way fuse distribution boards. Before the project was finally put in hand, however, alterations to the production lay-out and additions to the plant increased the number of motors to be fed to 250 and included six furnaces. It became apparent therefore that no fuse-board method of distribution could in itself meet the conditions, owing to the large number of fuse boards which would be required, the long lengths of sub-main cables to feed them and the long lengths of final circuit wiring to the motors and furnaces.

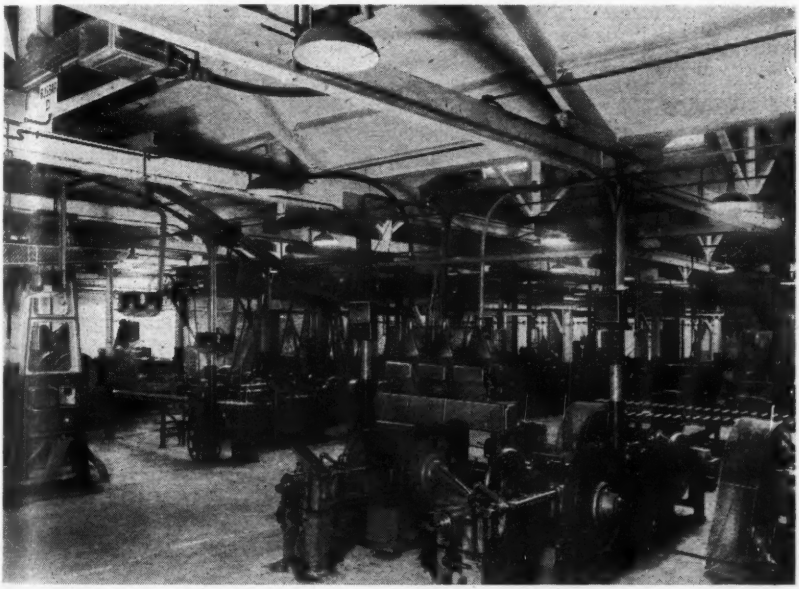


Fig. 1.—View of a machine shop indicative of a clean lay-out

* "Factory Installations," by J. G. Craven, *Electrical Review*, April 14th, 1939.

It was decided to use overhead busbars, and the scheme was laid out anew to incorporate five runs of busbars running longitudinally down the five factory bays. These runs, averaging 120 ft. each and spaced some 24 ft. apart with a 10 ft. spacing between the walls and the runs adjacent to them, are referred to as runs A, B, C, D and E, and cover the main area of the factory in Block "A." Each run consists of 12-ft. lengths of all-insulated three-phase busbars having a cross sectional area of 0·25 sq. in. and provided with tap - off points every 2 ft.

These tap-off points take plug boxes of three nominal ratings, 30, 60 and 100 A. Each fuse box is provided with its own high-rupturing-capacity fuses to give fault protection to individual circuits, and to give discrimination with the h.r.c. fuses located in the fuse switches on the sub-main switchboards which control the overhead busbar runs. By this means the effect of a short circuit is confined to the area in which the fault actually occurs and the remainder of the system remains "healthy," thus ensuring continuity of supply and production. An important advantage is that the plug-in fuse boxes can be inserted and withdrawn from the overhead busbar runs without the necessity for making the busbars "dead."

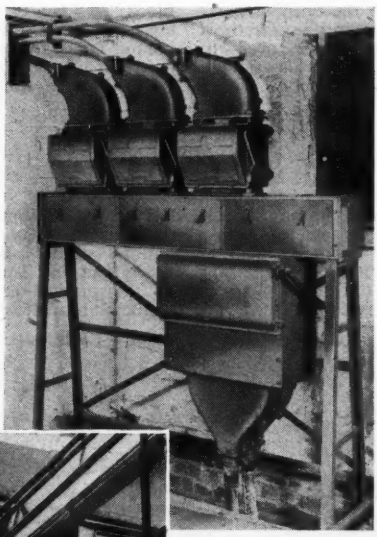


Fig. 2.—A sub-main switchboard

The erection of the busbar on the roof trusses proved a very simple matter, and by suitably positioning the cable entry box on each busbar run, a good "sweep in" for the 0·1 and 0·15 sq. in. p.i.l.c. and s.w.a. cables was obtained. A further point is that as the overhead busbar and its feeder cables are at roof truss level, the general distribution is kept clear of the floor area and also of the monorail conveyor system which girdles the factory (fig. 1).

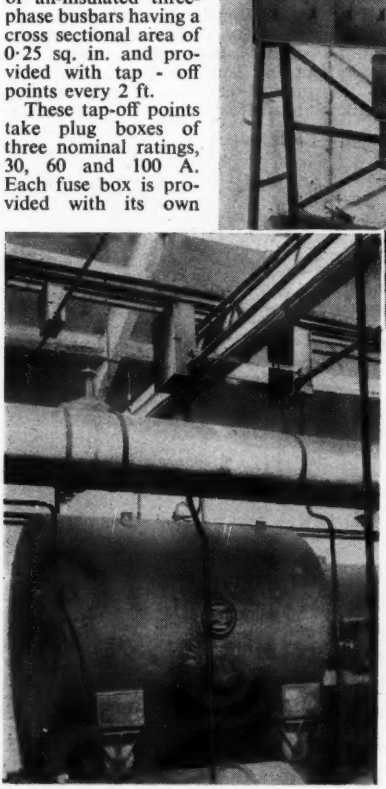


Fig. 3.—One of the 33-kW heat-treatment furnaces fed from a 100-A plug-in fuse box

There are two sub-main switchboards controlling the busbar runs designated P.1 and P.2, of which P.2 is located within the factory area, being fed by two 0·3 sq. in. four-core, p.i.l.c., s.w.a. and served cables, run at high level, which enter the board through a 750-A air-break h.r.c. fuse-switch. The board in question can be seen in fig. 1, which also shows the fuse-switches for each busbar, particularly the centre switch from which the cable goes to high level and then runs parallel to the truss to feed busbar D.

Sub-main switchboard, reference P.1, is located in a recess at the entrance to Block "A" (fig. 2). The comparatively low head room should be noted and the adoption of the angle-type cable boxes, which enable the 0·1 and 0·15 sq. in. p.i.l.c. and s.w.a. cables to be led off conveniently at high level, but at such a height as to avoid fouling the H girder forming part of the building. The entry of the two 0·3 sq. in. four-core p.i.l.c., s.w.a. and served cables into the 750-A fuse switch can also be noted, the cables in this case being run underground from the main switchboard situated in a medium-voltage switchroom adjacent to

the supply authority's high-voltage switch and transformer chamber, which houses a 750-kVA, 400-V, three-phase, 50-cycle transformer.

The diverse nature of the load catered for by the overhead busbar can be judged by noting that on run A the connected load is 106 HP, made up of circuits fed from eighteen plug-in fuse boxes, and ranging from a feed for a ½-HP motor to one for a 65-kW heat-treatment furnace.

Busbar run C has a connected load of 144 HP, which includes feeds to a 33-kW heat-treatment furnace (fig. 3) and to a group of $\frac{1}{20}$-HP motors.

For the feeds to the groups of $\frac{1}{20}$-, ½- and ¼-HP motors the overhead busbar acts as a sub-main feeder cable and the motors themselves are protected by means of h.r.c. fuses in a multi-way 15-A fuse board deriving its supply from the overhead busbar by means of a 30-A plug-in fuse box. The advantage of being able to tap off the busbar in this manner to feed sub-circuit boards, in addition to final circuits direct to machines, is obvious, as also is the reduction in the amount of sub-circuit wiring required and the avoidance of duplicated sub-main cables.

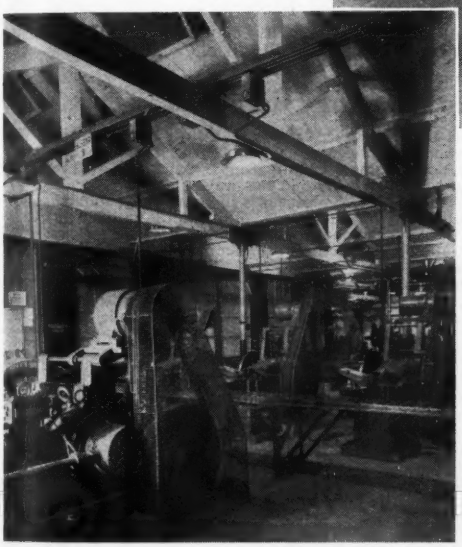


Fig. 5.—Individual runs of v.i.r. cable in conduit

In addition to the circuits mentioned and to the individually driven machines, a number of line shaft motors up to 20 HP was required in the final scheme, and these again are easily fed from the nearest point on the overhead busbar system.

A line of case and bullet drawing machines, above which runs busbar A, is shown in fig. 4. The plug-in fuse boxes will be noted and the comparatively short and simple run of v.i.r. in conduit down to the local isolating switch and push-button starter. There has been much controversy during the past few years over the provision and situation of the local isolating switch, but in our opinion the isolating switch should be at a convenient operating level, preferably near the starter which it controls. This applies whether the circuit is fed from a plug-box on overhead busbar, or from a multi-way fuseboard.

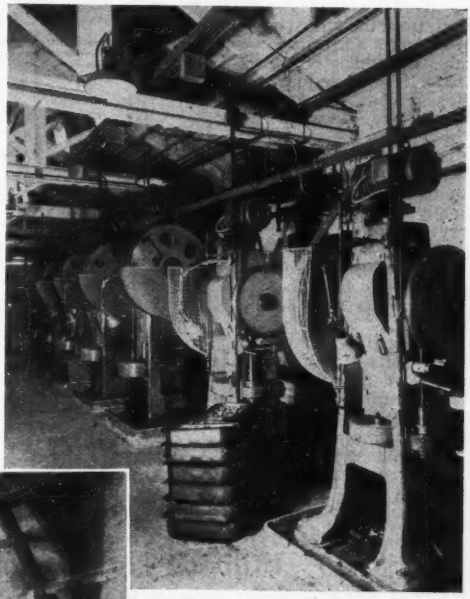


Fig. 4.—Line of machines each with vertical feed from overhead busbars

Other runs of v.i.r. in conduit from plug boxes on busbar B to individual machines are indicated in fig. 5, which also shows how the overhead busbar system keeps the floor clear and the area round the gravity conveyor free from leads and conduits.

In Block " B " the lay-out and number of

machines involved is such as to be more conveniently met by the more orthodox manner of distribution, using h.r.c. fuse-distribution boards. Fig. 6 shows a 0·15 sq. in. p.i.l.c. and s.w.a. cable entering an eight-way 60-A board at high level, from the busbars of which a further cable of similar cross section is taken to feed the adjacent ten-way 30-A h.r.c. board. Power points in the canteen are catered for by means of a local h.r.c. fuseboard deriving its supply from a 60-A way on the eight-way board.

In conclusion, another excerpt from the earlier article may be reprinted, namely, "The ideal lay-out in every detail for a power installation in a new factory is very rarely possible in view of the many contingencies that may arise." In the present case exigencies due to the ever-changing war situation have necessitated alterations in production, resulting in the re-arrangement of many machines. These changes have been most successfully met by the overhead busbar system which gives the essential flexibility. This electrical installation was carried out by Green & Smith, Ltd., Leeds, and the equipment was supplied by the English Electrical Co., Ltd.

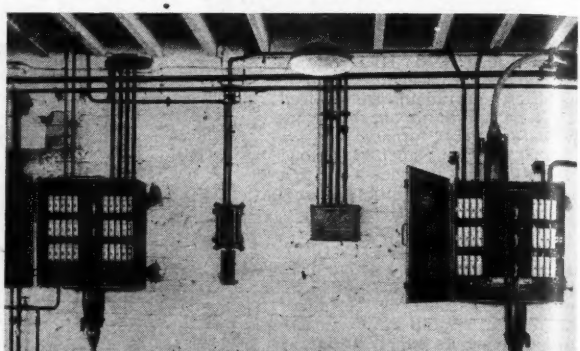


Fig. 6.—Arrangements for feeding high-level distribution boards

Utilising Non-Factory Labour

LATEST figures show that there are in this country some 20,000 outworkers—people whose age, domestic ties or other obligations prevent them from working in factories, but who are employed on special war production tasks in their own homes or elsewhere. Nearly half are in the London Region.

The Ministry of Production, in collaboration with the Ministry of Labour and the Supply Departments, has just issued a booklet describing several different types of outworking schemes throughout the country and explaining how to organise them. It is being distributed through Ministry of Production Regional Controllers to managements in those regions where additional labour is still required to meet expanding production programmes and where, therefore, outworking provides a means of meeting part of this requirement.

Arrangements can be made for people to do work individually in their own homes, in small groups working in the homes of their friends, or in suitable rooms in the locality. In other cases, halls or other premises in suitable centres may be taken over and opened up as small branch works to be manned by local people operating on a spare-time basis. The latter method, which is generally preferable, enables outworking to be applied to jobs of a heavier nature, which may require rather more elaborate equipment or call for closer co-ordination, supervision or inspection than is possible in direct home-work. Another category is the use of the National Fire Service or Civil Defence personnel, already organised into groups. Much valuable work has been done in this way.

The problem is to convince manufacturers of the advantages of outwork in districts where demands for additional labour for the expanding production programmes are still unsatisfied, for, generally speaking, there are more people prepared to do outworking that there is outwork for them to do. Regional Controllers of the Ministry of Production have undertaken to act as the co-ordinating authorities for the establishment of outworking schemes.

The booklet gives some interesting examples of successful outworking schemes. There is the case of an electrical firm, for instance, which discovered that 116 jobs were capable of being "outworked." Three small engineering firms were willing to become agents and these distributed work to the surrounding district. A staff was provided to give preliminary instruction and in less than 24 hours of delivery of the first load of parts an urgent request was received for more. In the first ten days an equivalent of 18,000 hours was worked.

Examples of jobs suitable for outworking depicted in photographs include the assembly of electrical sockets and plugs used on bomber aircraft and electrical communication components, and such tasks as the cleaning up of brush holders by filing.

Technical Education

Views of the Institution of Mechanical Engineers

A MEMORANDUM commenting on the recent White Paper on Educational Reconstruction has been issued by the Institution of Mechanical Engineers. The proposals of the Board of Education are welcomed, but judgment of their effectiveness is suspended until the publication of the McNair Committee's report on the training of teachers. The principal comments on the recommendations contained in the White Paper are given below.

The provision of facilities for technical education should be made obligatory. Reorganisation of higher technical education must cover both technical colleges and universities. Regional control of the larger technical colleges is necessary. Teachers of engineering must remain engineers with salaries and prospects comparable with those offered in industry. Remuneration is, also, often too low to attract competent teachers for part-time instruction. Teachers and university staffs should return to industry for periods of up to a year or of three months in consecutive years and should undergo refresher courses in particular subjects. Industrialists would be well-advised to allow senior members of their technical staffs the experience of acting as visiting lecturers in the daytime.

Facilities for Teachers

Teachers engaged on advanced work should be allowed more time for research and keeping abreast of technical developments in industry, but present superannuation regulations discourage this. Teachers should be available to local industry as consultants. They should be allowed to recover expenses incurred in going to meetings and conferences of professional institutions. They should be required to attend a summer course of instruction in technical teaching within two years of their first appointment. Exchange of teachers within this country and with educational centres abroad should be arranged. The standard of equipment needs to be improved by keeping it up to date with the aid of industrial organisations.

Students likely to profit by university education should be enabled to obtain it, as under the wartime State Bursary scheme, sometimes as a reward for exceptional ability during a works apprenticeship combined with part-time technical education.

In the United Kingdom there are twenty-six university schools with a pre-war annual output totalling 800 engineering graduates of all branches. In addition, there were 126 awards of external London degrees in engineering. The absorption capacity of potential employment of graduates should be ascertained with a view to meeting probably increased requirements.

Two main types of university entrants are, first, boys leaving school at eighteen and taking the higher leaving certificate and, secondly, boys who having left school at sixteen have three years' training in works and technical colleges with part-time day release. The Institution strongly supports the proposal that the former class should have one year's practical work in industry before proceeding to the University. This year should include part-time attendance at a technical college. The aim should be the development of physical and mental alertness.

Existing honours courses do not cater adequately for those intended for the manufacturing and administrative sides of engineering. A greater uniformity is required in the periods of study required for an honours degree candidate, which might be one year longer than that required for an ordinary degree.

Eight weeks of each long vacation should be spent in gaining practical experience in works, visiting engineering works abroad or working in a power station or a ship's engineering room. At the end of the three-year university course, the student should bring the overall time spent in works up to not less than two years. Post-graduate courses of one or two years would preferably follow the completion of practical training. The tendency of universities and technical colleges to specialise in certain fields for post-graduate and research work is to be encouraged.

Part-time Study

The Institution hopes that the minimum of one day a week for part-time study, compulsory up to eighteen years of age, will be extended voluntarily for older selected apprentices. As it is intended to devote part of the day to physical culture and training in clarity of expression, the time available may be insufficient to cover the National Certificate courses now in successful operation. One evening's classwork in addition may be requisite.

Beyond the age of eighteen, failing day release, two or three evening classes a week would be necessary to cover the Higher National Certificate. The National Certificate course might be extended to meet the Institution's requirements for corporate membership. Suitable technical colleges should be encouraged to offer full-time courses of degree standard, as the demand for

graduates is greater than can be met by the universities. A post-graduate college (possibly as an addition to an existing college) should be financed by the State to furnish full-time courses for established engineers.

Craft apprentice training may be given partly in the works and partly in college. The latter might be a full-time course prior to employment or concurrent with employment. A national certificate scheme for theoretical studies of craft students is urgently needed. Training for foremen and others in production planning, rate fixing and inspection should follow on National Certificate courses. The apprenticing of youths to limited sections of engineering, *e.g.*, drawing office and rate fixing is deprecated.

Craft apprentices should serve a probationary period of six to twelve months. Later transfers to alternative occupations should also be permissible. Instructors should be specially selected for the duty. Preliminary instruction of from six to twelve months should be given in special workshops. Small firms may have to rely on the technical college to provide some of the practical training as well as the whole of the technical. Proficiency should be gained within four years at most and should be a factor in determining the duration of apprenticeship.

Strong criticism is levelled against the deferment of provision for technical education (which is not included in the first four-year plan, except for a small allowance for " buildings "), on the ground that an adequate supply of fully trained professional engineers and craftsmen will be essential to national rehabilitation immediately after the war.

The Council of the Institution holds that the emergence of this country from its relatively backward position in technical education (and hence national rehabilitation of industry) depends largely upon the initiative of individuals in the hierarchy of the Board of Education. It believes that this is unlikely to be forthcoming unless some of the highest officials have been technically trained and are expert in technical education.

Electrical Maintenance

A *Planned Preventive Service*

IN furtherance of the campaign to avoid plant breakdowns the Directorate of Industrial Electrical Equipment, in collaboration with electrical manufacturers, is stressing the importance of regular inspection and maintenance of electrical equipment and the economy in materials which can be achieved by the elimination of renewals. The slogan " Minor repairs prevent major breakdowns " has been chosen for this purpose.

In this connection the September issue of the *Production and Engineering Bulletin* contains some interesting notes, submitted by a correspondent, on a system of planned maintenance which is operating successfully in a number of works. It is pointed out that organising any planned system takes time and energy at the outset, but once a good scheme is in operation the initial effort is soon repaid.

The scheme outlined provides for a weekly inspection to check for any incipient troubles. Being only visual, this takes but little time and does not entail shutting down any plant. Then at suitable intervals, say quarterly or half-yearly, according to the type or use of the equipment, all plant receives a detailed examination and overhaul.

These examinations are briefly recorded by the electrician in a duplicate log-book and the result entered by the records clerk (usually a girl without technical training) on summary charts. The charts are displayed in the engineer-in-charge's office, and so enable him to see, at a glance: (a) the condition of all plant; (b) that inspections and overhauls are made at the proper times; and (c) that no part of the installation is being entirely neglected.

All faults causing stoppage of plant are recorded on fault report forms which serve to bring to light any inherent weaknesses in types of gear or methods of operation which otherwise tend to be overlooked.

Copies of fault reports sent in from a number of different works are analysed together, thereby enabling troubles to be anticipated, cures determined and information gained at any one factory made available for all.

When this system was introduced in one large works, the daily reports of faults causing stoppage covered more than four pages; now, with more electrical plant installed the average is less than one page.

An analysis of electrical faults at another typical factory, in which planned maintenance has only recently been started, shows that the proportion of breakdowns due to lack of maintenance was 43 per cent.; of breakdowns due to abuse by operators, 34 per cent.; and of breakdowns due to unsuitable plant or faulty manufacture, 23 per cent.

While the system of planned maintenance outlined was primarily devised for the larger organisations with their own maintenance departments, it is thought that it could well be adopted by a number of smaller works operating a " pooled " maintenance scheme, or modified to meet the needs of the smaller manufacturer.

London I.E.E. Students

IN view of the success of the ramble from Dorking to Shere last July the London Students' Section of the I.E.E. has arranged another outing of this kind for Sunday, September 26th. A start will be made from Rickmansworth at 11 a.m. and the route will be by way of the Chess Valley to Amersham. The Section's next works visit (British Electric Transformer Co.) is fixed for Saturday, October 9th, at 2.30 p.m. Another interesting event is a " Brains Trust " meeting arranged for Monday, October 18th, at 7 p.m., for which questions should be sent in now.

Institution Sections

Brief Biographies of New Chairmen

THE 1943-44 session of the Institution of Electrical Engineers commences at the end of this month and, in accordance with our custom, we give below brief biographical details of the men who have been elected to serve as chairmen of the Transmission, Installations, Wireless and Measurements Sections of the Institution during the forthcoming year.

Mr. T. R. Scott, D.F.C., B.Sc., chairman of the Transmission Section, attended Falkirk High School and received his technical education at Edinburgh University and the Heriot-Watt Technical College. In 1921 he joined Standard Telephones & Cables, Ltd., and during the next ten years held various positions in the installation, cable engineering, and development laboratories on the cable side of this company's business. In 1932 he was appointed chief engineer of the Power Cable Division of the company and is now assistant technical director. Since 1942 he has been mainly occupied as chairman of the Cable-makers' (War Emergency) Technical Committee. Mr. Scott is an associate member of the Institute of Petroleum.

Mr. T. R. Scott

Mr. A. G. Ramsey

Mr. A. G. Ramsey, O.B.E., chairman of the Installations Section, received his education at Emanuel School, in Switzerland and Germany, and at the London University, where he took the B.Sc.(Eng.) degree with honours. His practical training was gained with the British Westinghouse Electric & Manufacturing Co., Ltd., Manchester, where he was one of the first college apprentices under Dr. A. P. M. Fleming. His association with H.M. Office of Works commenced in 1914, when he was appointed District Engineer, Scotland. Five years later he was transferred to London headquarters as Assistant Engineer, becoming successively Acting Deputy Chief Engineer, Engineer in Charge of Special Works and Deputy Chief Engineer, holding the last mentioned position until 1941 when he was appointed to his present position as Chief Engineer and Assistant Director of Works, Ministry of Works.

Mr. Ramsey is a member of the Engineering Divisional Council, the British National Committee of the International Electro-technical Commission and the Electrical and Mechanical Industries Committees of the British Standards Institution. He serves on various Ministry of Works and I.E.E. Post-War Planning Committees, and of the Codes of Practice Committee. He is a member of all three senior engineering institutions.

Mr. T. E. Goldup, the Wireless Section chairman, was an external student of London University and an assistant at the Royal Naval College, Greenwich. From 1914 to 1921 he was on the staff of the Experimental Department of the Signal School and H.M.S. *Vernon*, and in 1922 became technical assistant to the Mullard Radio Valve Co., of which company he is now a director. He is also a director of Radio Transmission Equipment, Ltd. Mr. Goldup is a representative of the British Radio Valve Makers' Association on the International Electro-Technical Commission.

Mr. T. E. Goldup

Mr. E. W. Moss

Mr. E. W. Moss, the new chairman of the Measurements Section, was privately educated and received his technical education at the City and Guilds Technical College, Finsbury. Early in his career, he was assistant to Mr. H. M. Hobart, M.Inst.C.E., M.I.E.E., and subsequently to Dr. E. G. Coker, F.R.S.

In 1906 he became associated with the late Prof. Silvanus P. Thompson in his consulting practice, as private assistant and during the next four years carried out much research work, some of which was recorded in a paper

read before the Physical Society and was subsequently printed in that Society's journal and in the *Philosophical Magazine* on "The End Effects of Bar Magnets."

In 1910 he became assistant to Boult, Wade & Tennant (patent agents) and left that firm in 1919 to join the late Mr. J. E. Raworth of Raworth, Moss & Cook, of which firm he is now sole proprietor. Mr. Moss is also London manager of John Richards & Co. (Electrical Engineers), Ltd., a director of John Richards & Co. (London), Ltd., and a member of the advisory staff of the Wellman, Smith Owen Engineering Corporation, Ltd.

Mr. Moss has served as a member of the Councils of the I.E.E. and of the Institution of Mechanical Engineers and has been awarded two Student's Prizes of the I.E.E. and a Graduate's Prize of the Institution of Mechanical Engineers, the latter for a research paper on "Materials Under Combined Stresses." He has been intimately connected with the Students' Sections of both Institutions, having served as secretary and chairman. He is also a fellow of the Physical and Chemical Societies.

I.E.E. Programme

Arrangements for the First Half of the 1943-44 Session

THE Institution of Electrical Engineers has issued its programme of meetings for the first half of the 1943-44 session as follows; all except the Nikola Tesla Commemorative Meeting commence at 5.30 p.m. (tea at 5 p.m.).

Ordinary Meetings.—Thursdays.

October 7th.—Inaugural address of the President, Col. Sir A. Stanley Angwin, D.S.O., M.C., T.D., B.Sc. (Eng.).

November 4th.—Joint meeting with Institution of Mechanical Engineers. Papers: "Bonded Deposits on Economiser Heating Surfaces," by Messrs. J. R. Rylands, M.Sc., and J. R. Jenkinson, B.Met., and "Causes of Dew-point Temperatures in Boiler Flue Gases," by Mr. W. F. Harlow, Wh.Ex.

November 25th (3 p.m.).—Lecture commemorating the life and work of Nikola Tesla, illustrated by examples of his experimental work, by Dr. A. P. M. Fleming, C.B.E., M.Sc.

December 2nd.—Papers: "The Economic Rating of Motors and Transformers" and "The Economic Flux Density of Large Supply Transformers," by Mr. D. J. Bolton, M.Sc.

Dates of meetings for the second half of the session are February 3rd, March 2nd, March 30th, April 27th (Kelvin Lecture by Prof. E. C. Stoner, Sc.D., F.R.S.), and May 11th (annual general meeting).

Informal Meetings.—Mondays.

October 25th.—Discussion of "How Far is International Standardisation in the National Interest?" to be opened by the President.

November 22nd.—Discussion of "The Administrative Structure of Electricity Undertakings," to be opened by Mr. G. V. Harrap.

January 24th.—Discussion on "Industrial Applications of Radio-frequency Methods of Heating," to be opened by Mr. N. R. Bligh.

Dates for later meetings are February 21st, March 20th and April 24th.

Installations Section.—Thursdays.

October 14th.—Inaugural address by the chairman, Mr. A. G. Ramsey, O.B.E., B.Sc. (Eng.).

November 11th.—Paper: "Emergency Lighting Systems and their Applications, with particular reference to Battery Equipments," by Mr. S. H. Chase.

December 9th.—Paper: "Industrial Fire Risks," by Messrs. W. Fordham Cooper, B.Sc. (Eng.), and F. H. Mann.

Other meetings of the Installations Section have been arranged for February 10th, March 9th, April 13th and May 4th.

Measurements Section.—Fridays.

October 22nd.—Inaugural address by Mr. E. W. Moss, chairman.

November 19th.—Paper: "Instrument Transformers," by Mr. A. Hobson, B.Sc.Tech.

January 21st.—Paper: "A New Electronic Stabiliser and Regulator for DC Voltages," by Mr. A. Glynne, M.A.

Later meetings have been fixed for February 18th, March 17th, April 21st and May 19th.

Transmission Section.—Wednesdays.

October 20th.—Inaugural address by the chairman, Mr. T. R. Scott, B.Sc.

November 10th.—Paper: "Maintenance of Distribution Plant and Mains on AC Networks," by Messrs. F. N. Beaumont, B.Sc. (Eng.), and F. A. Geary.

December 8th.—Paper: "The Problem of Conductor Sagging on Overhead Transmission Lines," by Messrs. C. O. Boyse, B.Sc.(Eng.), and N. G. Simpson.

For the second half of the session the dates of meetings are February 9th, March 8th, April 12th and May 10th.

Wireless Section.—Wednesdays.

October 13th.—Inaugural address by the chairman, Mr. T. E. Goldup.

November 3rd.—Paper: "Wave Guides in Electrical Communication," by Mr. J. Kemp.

November 16th (Tuesday).—Discussion on "The Role of Ultra-High Frequencies in Post-war Broadcasting," to be opened by Messrs. K. I. Jones and D. A. Bell, M.A., B.Sc.

November 24th.—Paper: "Enemy Airborne Radio Equipment," by Mr. C. P. Edwards, M.Sc.Tech.

December 1st.—Papers: "Electrical Hearing Aids," by Mr. T. S. Littler, Ph.D., M.Sc., and "A Basis for the Prediction of Performance of Hearing Aids," by Mr. C. M. R. Balbi.

January 18th (Tuesday).—Discussion of "Comparative Merits of Different Types of Directive Aerials for Communications," to be opened by Mr. J. A. Smale, B.Sc.

Other dates arranged are February 2nd, February 15th (Tuesday), March 1st, March 21st (Tuesday), April 5th, April 18th (Tuesday) and May 3rd.

Public Lighting Equipment

Maintenance of Fittings. Lamp Replacement Records.

By F. H. Pulvermacher, A.M.I.E.E.

NOW that winter is approaching public lighting engineers would under normal conditions be completing their annual overhaul of equipment in preparation for the oncoming season. Although the war has limited the scope of this work, a minimum amount of maintenance at regular intervals is necessary in order that the equipment may remain in a fit state for resumption of lighting immediately that is permissible. Most undertakings are responsible for a certain amount of traffic lighting other than that of the actual road surfaces, in addition to the normal work that is directly occasioned by the war, such as "starlight" illumination of roads, obstruction lanterns of the St. Andrew's cross type and A.R.P. directional signs.

When the long-anticipated signal is given for the end of the "blackout" the public will expect an immediate resumption of street lighting. In spite of the labour shortage, therefore, local authorities should provide where possible for the routine inspection of equipment to maintain it in good order

It may be assumed that steps have already been taken to ensure that lamps always remain unlit where not required. The mere withdrawal of the control fuses at the central point of switching, where groups of lamps are controlled by means of a fifth core or pilot wire, is insufficient. Each lamp should be dealt with separately, both bulb and individual fuse being taken away, as otherwise, in the event of damage to the distributors by enemy or other action, there is a very real possibility of the lamp circuit becoming energised.

Need for Regular Inspection

In the absence of the normal routine inspection and a painting programme, fittings can deteriorate considerably before this becomes evident to a passing glance, and regular inspection should be made, particularly of parts of a ferrous nature. Among items that require careful scrutiny are door hinges, latches, fixing studs and such screws as are used in the assembling of fittings; fixing devices when made of wire or spring clips are also liable to attack. Screwed surfaces should be freed and liberally coated with a thick oil or grease. Where complete painting is not feasible, those portions liable to be affected should at least be treated locally. A paint with a bitumastic base has been found to be very satisfactory for durability. The suspension wire of lamps with raising or lowering gear will almost certainly show considerable rusting, and in several cases the suspended fitting has fallen to the ground due to the snapping of the wire; this represents a very considerable risk. After four years of non-use, fittings of the silvered-glass type are rapidly losing their reflecting qualities owing to the peeling off of the backing, while a considerable amount of damage has also been caused by stone throwing. The only real remedy for this is storage, but, if this is impracticable, steps should be taken to ascertain what replacements will be required at the end of the war, and contact might be made with the suppliers of the necessary fittings now. Where mercury- or sodium-vapour lamps are used, a watch should be kept on the attendant chokes and condensers since, although these are not liable to damage through exposure, they may have a low insulation resistance to earth arising from non-use. Insulation tests should be taken at six-monthly intervals and any choke showing less than 250,000 ohms should be removed and dried out.

Wartime Lighting

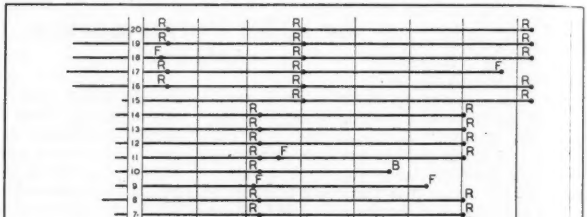
With regard to wartime "starlighting" schemes, there is no doubt that the replacement of lamps after a certain number of hours is far preferable to the policy of changing them as they fail, for although the changes will be more frequent, the saving of labour will more than compensate for this, since (apart from the advantage of fewer "outs") groups of lamps can be more speedily dealt with than widely dispersed individual lamps. The intervals between replacements can be greatly extended by using lamps of a higher voltage rating than the normal; as an example, it has been found that, by employing bulbs rated at 260 V instead of 240 V, a life of 2,000 hours is attained, apart from the usual premature failures, while the loss of illumination is not noticeable with the low lighting intensities involved.

These remarks also apply to traffic guides such as guard posts, obstruction lanterns, but here, on grounds of safety, a replacement period of 1,000 hours or even less in extreme cases is preferable, as there is a considerable shortening of life due to traffic vibration. Routine replacement is particularly justified in the case of signs with only one lamp; where two lamps are embodied, the risk of both being extinguished simultaneously is so slight as to allow failures to be replaced as discovered during routine inspections, pro-

vided these are frequent enough for detection of a lamp failure within a reasonable time. The falling off in efficiency is not important, as the lamp is screened. The position of the bulb has a considerable bearing on its life, lamps which are burnt horizontally having about half the life of those in a vertical position in similar fittings—a point to be born in mind when purchasing equipment.

Records covering all lamps should be kept, for which purpose a card index has been found most suitable. Each lamp has its card on the front of which is given its serial number, the lighting authority, dates of commissioning and alterations, location, brief details of equipment,, method of switching, *i.e.*, individual or group (if the former, time switch details; if the latter, location of control). On the reverse side are given the dates of lamp replacements and the reason, whether failure, breakage or routine change, together with the hours of life.

In order to keep track of replacements, a chart can be made with horizontal columns relating to the life of each lamp and vertical showing the dates and burning hours. A line drawn along the appropriate horizontal column terminates in a dot on the day of replacement; the dot is marked " F ", " B " or " R " according to the cause. The life of the replaced lamp is readily found from the number of hours spanned by the line joining the two dots marking the commissioning and replacement of the lamp; the date upon which a lamp will require changing can also be easily found by projecting the line the necessary number of hours and then reading the date off the scale below.



Lamp replacement chart

News from Australia

LAST year the Commonwealth Government's powers were extended to ensure that, in the interests of defence, the generation, transmission and distribution of electricity were mobilised and co-ordinated. Under these powers Mr. H. P. Moss was appointed Controller of Electricity Supply, and the appointment of the following Regional Controllers is now announced in *Erda:* Messrs. S. F. Cochran, chairman, Queensland State Electricity Commission; R. J. Dumas, Director of Works, Western Australia; W. E. McLean, chairman, Tasmanian Hydro-electric Commission; R. W. Persons, principal, Adelaide School of Mines; G. G. Jobins, Victoria State Electricity Commission; and V. F. J. Brain, chief engineer, New South Wales Public Works Department. Mr. H. G. Conde, general manager of the Electric Light & Power Corporation, Ltd., has been appointed Assistant Regional Controller for New South Wales.

Sale of Appliances Restricted

The *Electrical Engineer and Merchandiser* (Melbourne) reports that a regulation has been promulgated under the National Security (General) Regulations restricting the retail sale of heating and cooking appliances. A prospective retail purchaser of any of the articles prescribed in the regulation must first obtain a permit from the Department of War Organisation of Industry. " Purchase " includes acquisition by hire or any other method. The regulation does not apply to parts for repairing existing appliances or to the supply of any articles by a distributor to a retail house for resale. Electrical appliances enumerated include stoves, ranges and table cookers, toasters, radiators, fire units, irons, hotplates on stand, water heaters, jugs, washboilers, kettles, and electric air conditioning plant.

Radio Licences

Figures published in the *Merchandiser* (Sydney) show that at the beginning of the current year the number of licences in force for single radio receivers was 1,342,512, equivalent to 19·90 per cent. of the population. Licences for more than one receiver numbered 30,840.

Our contemporary also reports that the Postmaster-General has announced the Government's intention of building two new regional broadcasting stations, one in Western New South Wales and the other in Queensland.

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE staff of all sections of the East Ham Electricity Department met on September 3rd to present a silver teapot to **Mr. W. R. Elliott,** A.M.I.E.E., who has retired from the position of engineer and manager after nineteen years in that position and forty-two years' service in the Department. The presentation was made by Councillor Dixon, chairman of the Electricity Committee, who referred to the progress that had been made under Mr. Elliott's administration, and members of the staff added their praise, the main theme being the happy relations that had existed between Mr. Elliott and every employee in the Department.

To celebrate the occasion, a tea was later served in the Department's canteen and Mr. Elliott was the guest of the staff, as were also the Mayor (Alderman Mrs. Wilkens, J.P.), Councillor Dixon and the vice-chairman (Alderman Barton). At this function the chairman made a presentation of an illuminated testimonial. In acknowledging this presentation Mr. Elliott recalled the various stages in the development of the undertaking since 1901, and mentioned that it was very gratifying to him that he was not to sever his connection with the electrical industry. As we recorded in our issue of July 23rd, Mr. Elliott has been appointed secretary to the Council of the Electrical Research Association.

Mr. W. Richards, Victorian manager for Johnson & Phillips, Ltd., has been appointed general manager for Australia in succession to the late Mr. A. E. Kinsley.

Capt. Geoffrey Winstanley, only son of Mr. Frank Winstanley, a director of the General Electric Co., Ltd., was married last Saturday at Kantara, Egypt, to Miss Winifred M. Mountford. Before joining the Royal Corps of Signals at the outbreak of war Capt. Winstanley was for some six years with the G.E.C. at the company's Appliance Works and at Kingsway. He has seen service in Abyssinia and the Western Desert and is now in Egypt. His wife is a sister in the Q.A.I.M.N.S.

The Council of the South African Association for the Advancement of Science has awarded the South African medal and grant for 1943 to **Professor B. F. J. Schonland,** O.B.E., M.A., Ph.D., M.I.E.E. (South Africa), F.R.S. The *South African Engineer and Electrical Review* states that Prof. Schonland is director of the Bernard Price Institute of Geophysical Research, Johannesburg, and holds the Carnegie-Price Chair of Geophysics at Witwatersrand University. At present he is on full-time service as a brigadier in the Union Defence Force, seconded for highly specialised scientific work with the Army and its authorities in England.

Mr. A. C. Fenwick, general manager, Cape Electric Tramways, Ltd., and chairman of the Cape Peninsula and District Sub-Centre of the Institute of Transport, has been appointed a member of the Transport Advisory Council and as a consequence will be stationed in Johannesburg for the duration. **Mr. A. J. Smither** is now acting as general manager of the tramways.

Mr. G. Keith, chairman and managing director of Keith Blackman, Ltd., has been presented by the directors, staff and workpeople of the company with a silver tray and a gold watch chain to mark the completion by him this month of fifty years' service with the company.

Mr. J. D. McNeil, B.Sc. (Eng.), A.C.G.I., has been elected chairman of the London Students' Section of the Institution of Electrical Engineers for the 1943-44 session and **Mr. C. C. Barnes** is the new vice-chairman.

In referring to the recent presentation to **Mr. S. R. Windle,** who has retired from the position of borough electrical engineer at Grimsby we incorrectly referred to him as Mr. D. S. Windle.

The Sheffield City Council has approved the appointment of **Mr. R. H. Coates,** A.M.I.E.E., B.Sc. (Hons.) London, to the position of deputy general manager and engineer of the electricity undertaking.

Mr. Coates received his technical training at the Polytechnic, Regent Street, London, and at the Salford Technical College, and obtained the Robert Mitchell scholarship and the Mitchell gold medal for the best student of the year at the Polytechnic. From 1927 to 1931 he served his apprenticeship with the Metropolitan-Vickers Electrical Co., Ltd., at Trafford Park, Manchester, where he gained experience in most of the sections of the company's works. From 1931 to 1932 he was employed by Kennedy & Donkin on the North-West England and South-West England grid schemes. In 1933 Mr. Coates joined the Central Electricity Board as an assistant operation engineer and later became technical assistant at the head office of the Board in London. He went to Sheffield in 1937 as chief technical assistant and has held this position up to the present time. His salary as deputy general manager and engineer will be £1,100 per annum, rising to £1,400.

Obituary

Mr. C. O. Grimshaw, M.Inst.C.E.—The death occurred at Chobham on August 27th, at the age of eighty-one, of Mr. Conway Osborne Grimshaw, who was for many years assistant engineer-in-chief of the Westminster Electric Supply Corporation, Ltd. (now merged in Central London Electricity, Ltd.).

Mr. Grimshaw received his early engineering training as a pupil with Combe, Barbour & Combe, of Belfast, and subsequently went to the United States for further training, working for two years with the Brown, Sharpe & Betts Machine Co. Returning to this country, he joined the staff of Crompton & Co., in 1885, and was employed as resident engineer on several electrical contracts, such as for the Woolwich Arsenal, Barry Docks, Tilbury Docks, etc. He was sent to India and Burma by Crompton's in 1888, to act for the Orient Electric Lighting Co. and to report on establishing lighting stations.

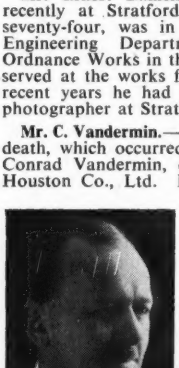
In 1890 he was appointed resident engineer to the Eccleston Place station of the Westminster Electric Supply Corporation, Ltd., and in 1897 became assistant engineer-in-chief, a position which he held until his retirement in 1926. From 1899 to 1902 he was responsible, under the late Sir Alexander Kennedy, for changing the original three DC generating stations of the company at Eccleston Place, Davies Street and Millbank to motor-generator substations. This was concurrent with the building of the Central Electric Supply Corporation's generating station at Grove Road and this, together with the substations, formed one of the earliest three-phase systems at 6,600 V. In addition to his other duties, Mr. Grimshaw was at the time appointed deputy chief engineer to the Central Electric Supply Corporation, Ltd. During the last war he also held a post under the Ministry of Munitions, directing the production of munitions in a large number of small factories in south-west London.

He was, among other things, a gifted craftsman, especially after his retirement, and in earlier years vied with the late Col. Crompton, firstly in riding a bicycle constructed with long cranks and later in driving one of the first steam-driven motor-cars.

Mr. Grimshaw leaves a widow, one son and one daughter. It is interesting to note that his daughter, Miss Helen Grimshaw, is also an engineer, and was the first woman student of the Institution of Civil Engineers.

Mr. Ernest Daniels, A.M.I.E.E., who died recently at Stratford-on-Avon at the age of seventy-four, was in charge of the Electrical Engineering Department at the Coventry Ordnance Works in the last war, and altogether served at the works for over twenty years. In recent years he had carried on business as a photographer at Stratford.

Mr. C. Vandermin.—We regret to announce the death, which occurred on August 30th, of Mr. Conrad Vandermin, of the British Thomson-Houston Co., Ltd. Mr. Vandermin was born in London in 1888 and was educated at Dulwich College, Faraday House and the City & Guilds College. He entered the B.T.H. works at Rugby in 1911 and (except during the last war, when he served in France) had been with the company ever since, first at Rugby as an AC machine designer and as a commercial engineer on motor sales, and later in London as manager of export lamp sales, which post he had held for the past fifteen years. While at Rugby he studied law and was called to the Bar in 1928. He was also a director of the Isle of Thanet Electric Supply Co., Ltd., the Kalgoorlie Electric Power and Lighting Corporation, Ltd., and the Timbang-Dali (Sumatra) Rubber Co., Ltd.



The late Mr. C. Vandermin

Mr. William Hay Howden has died at Johnstone, Renfrewshire, at the age of fifty-nine. He was a director of James Howden & Co., Ltd., James Howden & Co. (Land), Ltd., and the British Arc Welding Co. (Scotland), Ltd.

Mr. W. P. Digby.—A memorial service for the late Mr. W. P. Digby, a partner of Heap & Digby, Ltd., consulting engineers, has been arranged to take place at the Lyndhurst Road Congregational Church, Hampstead, N.W.3, on September 25th, at 3.30 p.m. The service is being taken by the Rev. C. Stanley Herbert and the address is to be given by Professor J. H. Baxter, M.A., B.D., Instr.Cdr., R.N., of St. Andrew's University.

Electricians' Wage Claim

LAST week a mass meeting of members of the Electrical Trades Union concerned in the electrical contracting industry was held at Salford to consider the wage position arising from the national delegate conference at Birmingham. It was announced afterwards that if the employers at their meeting on September 14th did not meet the men's claim for an additional 3d. an hour the men were prepared to take strike action to enforce it. On Tuesday of this week it was reported that some hundreds of workers on the contracting side of the electrical industry in Manchester had stopped work the previous night as a protest against the present rates of pay and working conditions. There was also a threat of the strike spreading to other sections of the industry in the area if the application for a national increase of 3d. an hour was not conceded. The demand was considered by the National Federated Electrical Association on Tuesday. Between 40,000 and 50,000 workers are stated to be affected.

More than 200 electricians who struck work at a Clyde shipyard last week on a bonus and payment-by-results issue agreed to return to work on the understanding that the union would negotiate with the employers.

British Institution of Radio Engineers

AT the annual meeting of the British Institution of Radio Engineers held recently in London, Sir Louis Sterling revealed that the Institution's Parliamentary Committee has under consideration for the coming year proposals for a national scheme for basic research in the radio industry, to be sponsored by the Government.

At the conclusion of business, Sir Ernest Fisk surveyed the history of wireless telegraphy and broadcasting from the beginning of the century, describing some of the technical and prejudicial difficulties that had to be overcome before direct Empire communication, so essential to Australia, could become an accomplished fact. As first president and immediate past-president of the Institution of Radio Engineers of Australia, he looked forward to the time when the two bodies could work in co-operation.

Engineering Economics

AN abbreviated version of "Inwood's Tables of Interest" by Sir William Schooling has been published by the Technical Press, Ltd., Gloucester Road, Kingston Hill, Surrey, price 5s., for the special use of engineers. It contains a foreword on their application to engineering economics by Sir Frank Gill and copies will be available in time for the first of the three University Extension Lectures on the subject at the Institution of Electrical Engineers, London, next Tuesday.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.

Post-War Planning

PARTICULARS regarding the organisation and constitution of the Ministry of Works (Directorate of Post War Planning), the I.E.E. and the I.M.E.A. Committees on Post-War Planning which are dealing in their respective spheres with all matters affecting the electricity supply industry have been collected, as far as I have been able to do so, in the enclosed memorandum. [An abstract appears on another page.—Editors, *Electrical Review*.]

From the inquiries which I have made there appears to be a considerable lack of knowledge of these facts and therefore of the circumstances which make it possible for the issue by the London and Home Counties J.E.A. and the E.P.E.A., and possibly others in the future, of independent proposals for dealing with the post-war reorganisation of electricity supply.

Information is to hand that a very great deal of work has been carried out by the bodies mentioned and also, I believe, by the Joint Committee of Electricity Supply Associations. Unquestionably, however, many individuals are beginning to feel that some information should be forthcoming on the progress of these Committees up to date.

I suggest strongly for the consideration of the I.M.E.A. and the I.E.E. Committees that a stage has now been reached when there should be published interim reports giving outlines of the work so far carried out and indicating what yet has to be accomplished.

Southwark. F. S. NAYLOR,
Electrical Engineer and Manager.

Rural Scheme's Success

AS one more than interested in rural electrification, your reference in the *Electrical Review* of August 27th to the Norwich Corporation's " success " leads me to ask for more information. The fact that the deficit has decreased since 1939 suggests some connection with war load and not developments in farm load.

I understood that Norwich rural prices were 30–40 per cent. above city prices (8d. to 5d. lighting; 20 per cent. to 11¼ per cent. of rateable value fixed charge and 1d. to ¾d. " unit " charge), which was understandable, and explainable to the rural community. A surcharge of 12½ per cent. was added to all tariffs in 1940, but the rural rates should have been exempted or had a lower surcharge if they were doing nicely.

If the rural scheme is really a " success," *i.e.*, the electrical lesson has been learnt and the farming community consumption increased until a profit materialises, then surely *lower* rural prices can be justified. " Carrying city load " by rural profits would surely be shameful instead of laudable and would retard development in other parts of the country by being cited against the rural undertaking, which might not have the benefit of a selected station behind it, and thus be paying a good deal more for its energy.

*London, N.*22. A. CARTER.

We have given Mr. John A. Summer, city electrical engineer of Norwich, an opportunity of replying to the above letter. He writes:—

MR. Carter requests information as to the reason for the change from an annual deficit to an annual surplus in the Norwich rural area. The disappearance of the deficit is due to the simple fact that, after thirteen years, the rate of increase in income is now greater than the rate of increase in annual charges. Unless a rural area, of the density of that of Norwich, is badly developed or administered, this should always happen in from five to fifteen years from commencement.

The true reason for the change is, firstly, that the rural load had been growing slowly since the inception of the scheme and, secondly, that a special effort has been made during the last three years to develop quickly the potential load which was available; also, because there has been effected a reduction in the costs of running the area.

As an example, during the last year we have secured the change-over from oil-engine to electric drive of five of the fifty-five marsh drainage pumping stations in the area (each of 70 HP), and it is expected that all these pumps will now be changed to electric motor drive.

We have also carried out an intensive campaign with the new E.R.A. automatic grain-grinding mill and, during 1943, fifteen of these mills have been installed, and orders for fifteen more are in hand. Again, as a measure of the intensive progress during the last three years, the progress of the past six months may be quoted, when, *inter alia*, 12 milking machines, 4 sterilising chests, 57 farm motors, 2 baking ovens, 158 cookers on existing services and 54 farms have been connected up, all with the approval and certificate of the War Agricultural Executive Committee.

War conditions have undoubtedly helped, but an *accelerated increase* of consumption equal to one-million kWh per year (or £8,000)

is bound to have an effect sooner or later. Your correspondent seems to suggest that we should immediately reduce the rural area charges because, for the first time in thirteen years, there is a net surplus (and an accumulated deficit of £120,000). I am afraid that it is not quite so easy as he would suggest to effect this change immediately. The " rural profit " will hardly " carry a city load " which has been seriously reduced, by bombing and other causes, by an amount which is large but which I am not permitted to reveal. Nor is the time propitious to suggest such an immediate reduction, when the undertaking is paying 43s. per ton for coal as compared with 22s. in 1938, and the cost of electricity (per kWh) at the power station has increased by 50 per cent. We are paying to the C.E.B. £80,000 more in 1943 than we were paying in 1939 for a similar consumption, and less than £50,000 of this increased cost has been met by the increase in charges. Incidentally, the average price per kWh in the city area (excluding power) is 1·72d. per kWh and in the rural area 1·9d., the latter being less than 10 per cent. greater and not 30 per cent., as your correspondent states.

I think I can assure Mr. Carter that at the first opportune moment I shall recommend a standardising of charges between the rural and city areas, probably at an earlier date than " wartime " income tax is reduced by the Chancellor of the Exchequer.

The N.J.B. Schedule

YOUR issue of September 10th refers to the dissatisfaction of members of the E.P.E.A. with regard to the N.J.B. Schedule of salaries. This has been evident at all section meetings of this Association for some months, and members have been told that it is hoped to obtain an increase for those at the *bottom* end of the scale. This appears to be an unhappy solution, for, despite cost-of-living increments, it is all too evident as time goes on that the basic Schedule figures are too low all round.

During the war the A.M.E.E. has negotiated a new schedule covering chiefs' salaries, but some difficulty has been experienced in getting this applied in all the undertakings concerned. One reason was that in many cases the new chief's scale was so far in advance of the deputy chief's or next senior official that the councils concerned raised objections.

To overcome this difficulty the A.M.E.E. approached the E.P.E.A. and suggested that Grade 1 on the N.J.B. Schedule of salaries should be awarded two-thirds of the appropriate chief's scale with a possible adjustment in the case of the Grade 2 official.

This suggestion was acclaimed by the E.P.E.A., but if successfully negotiated it will undoubtedly raise a storm of protest from members of Grade 3 and downwards, owing to the great disparity which will then be evident as between the top grades and those lower down the scale.

It has been admitted that revision of the N.J.B. Schedule is overdue, so that surely the E.P.E.A. could have gone all out for this rather than pandering to suggestions from the A.M.E.E., which will not benefit E.P.E.A. members as a whole. " FAIRPLAY."

Thermoplastic Cables

THE letter of Mr. J. F. Kenure in your issue of September 3rd can be briefly replied to as follows:

My original letter which appeared in your issue of August 20th, and on which he comments at length, was written with the full knowledge and approval of the Ministry of Supply's Cable Planning Officer.

The Cablemakers' Planning Committee and the Cablemakers' (War Emergency) Technical Committee are not private advisory committees as Mr. Kenure suggests, but are committees set up by the whole of the cable industry at the request of the Ministry of Supply's Cable Planning Officer to advise him and the Service Departments on cable matters in general, and in particular, the reduction in the use of rubber in cables and the exploitation of all available substitutes (including P.V.C.). Inquirers need not, therefore, have any anxiety that any bias will be introduced in any advice tendered regarding the usage of P.V.C. cables. On the contrary, the massed experience of Service Departments and of over forty cablemaking firms represented by the above-named committees (many of them with years of experience on thermo-plastic cables) are available to inquirers.

Dorking. W. F. BISHOP, *Chairman*,
Cablemakers' Planning Committee.

City and Guilds Institute

THE report of the Council of the City and Guilds of London Institute, including financial accounts for 1942, reveals that the entries for technological examinations for 1943 total more than 25,500, of which 2,900 were received at centres in the Empire overseas and 1,100 from prisoners of war in Germany. A special final examination was held just a year ago for students who had attended the six months' intensive courses in electrical engineering organised by the Board of Education in conjunction with certain technical colleges for the Ministry of Labour ; of the 145 candidates 44 passed Parts I and II and in addition 51 passed Part I only. Since 1930, syllabuses for 34 new subjects, or branches, have been formulated, among them being courses for motor vehicle electricians, electric arc welders, radio service work and illuminating engineering. The Institute is the only national body providing examination syllabuses for artisans and craftsmen as such, the Technology Department listing 125 subjects and so guiding the instruction given to upwards of 500,000 students yearly in Great Britain and Ireland.

Boiler Availability

Aspects of Selection, Design and Operation

By V. Smith, B.Sc.Tech.

RECENT references in the technical Press to measures adopted for increasing boiler availability have dealt with water lancing as a means of reducing slag accumulations. This is an operational function applied to existing boilers, and has shown good results, but it is only one aspect of an urgent problem. A complete solution must include many other relevant factors, starting with the inception of a new plant and dealing with conditions as they will exist right through its useful life.

Plant Capacity

In the normal sequence of power station design the selection of boiler plant capacity follows immediately after the determination of the electrical generating requirements.

There appears to be, at present, no settled policy as to the evaporative capacity necessary for a particular number of kilowatts. Even in recent plants a figure of about 10 lb. of steam per kW has sometimes been taken as the sole guide. Whilst this may be satisfactory if the boiler design is liberal, in all too many cases it is found that due to inferior coal or other changes from the designed operating conditions the boilers will not give the rated output.

In submitting these notes with regard to the attainment of peak availability the author says it is desirable that the broadest possible light should be shed upon the problem, which requires a great deal of further study

Two points require consideration. Firstly, specifications must call for boilers of adequate capacity for the highest possible steam demand. Secondly, there must be assurance that this demand will be met, even when the boilers are working with poor fuels or under other adverse conditions.

The first point concerns the number of boilers, including spare units, and their individual capacity. In this country one or two modern stations are of the one-boiler one-turbine type, but the more usual arrangement is two per turbine, whilst at least one leading power company advocates four per turbine. Opinion on the first-named arrangement is divided, many engineers holding that the conditions under which boilers have to operate will never produce the same availability as that of the turbine.

Experience in the United States does not seem to bear this out, but a study of outages (other than those caused by slag) appears to show that considerable advances have still to be made both in construction and in methods of operation before greatly increased availability may be expected. However that may be, the adoption of the two following rules, with such modifications as experience may dictate, would appear to constitute the first essential step:—

(1) Individual boilers, or groups of boilers, serving one turbine, should have a maximum continuous rating 25 to 30 per cent. greater than the turbine m.c.r. consumption. This will ensure that (a) under adverse combustion conditions, and particularly when age begins to restrict evaporation, full electrical output is assured; (b) under favourable conditions easy steaming conditions will prolong life and reduce maintenance; and (c) should one boiler break down, the remainder can normally carry the greater part of the load between them.

(2) Regarded purely from the view of present availability figures, spare boilers appear to be essential, but if further thinking at the design stage and painstaking care in the field eventually prove that boiler availability can be raised to equal that of the turbo-generator, then the problem of spare boiler capacity, with its heavy capital charges, will diminish. In the meantime, spare boilers should be provided at the rate of, say, one for every four working. If one of the turbines is itself spare then a complete spare boiler-turbine group may be employed, but a good deal depends on circumstances. The existence of the grid in Britain, for instance, has greatly reduced the necessity for spare plant, and a decision must take this factor into account, whereas in an undeveloped country a ratio of one spare boiler for two working may be necessary, since one must stand by whilst another is down for repair. In smaller plants, consisting of, say, two turbines, one spare boiler may comprise 33⅓ per cent. or even 50 per cent. of the total evaporative capacity, but this cannot be avoided where the total number is only two or three.

The paramount rule is to ensure that, whatever the circumstances, the electrical output is maintained, and that valuable plant or services are not idle due to any error in the original selection of boiler capacity.

In the discussion following the paper by Messrs. W. C. Parker and H. Clarke on Fulham generating station (*I.C.E. Journal*, June, 1938) the following apposite comments appear:—"It was the authors' opinion that experience over recent years with the grid

system and base-load stations had shown that the boiler-capacity available in stations, as designed in the past, had not proved to be adequate to ensure full availability of the turbine plant. Boiler makers had quoted boiler-performance in terms of 'maximum continuous rating'; the authors believed that to be an erroneous term, as it indicated that the figure given could be maintained for a reasonable life of the boiler, whereas experience showed that there was a decline in the evaporative capacity of a boiler over its life and, further, that if a boiler were forced to work at the rating designated by the manufacturers, efficiency would be sacrificed and maintenance and outage would become excessive. The authors believed, therefore, that boiler-performance should be expressed in terms of 'economic continuous rating,' and their experience showed that the figure for economic continuous rating was approximately 85 per cent. of the maximum continuous rating. . . ."

The above remarks underline the second issue outlined above, *viz.*, the need for assurances that specified outputs will be attained, and maintained, under all conditions and at all times. A manufacturer should not be able to plead, when the evaporation falls off, that the plant is working under conditions for which it had not been designed, but unfortunately, under present conditions, this is liable to occur, due to no fault of the manufacturer. Plants supplied by different makers inevitably differ somewhat in regard to maximum output, but all agree in this, that whilst rated at a level which will comfortably achieve the specified performance, they will not necessarily maintain this performance under conditions for which the specification does not provide.

Uniform conditions are unlikely to obtain throughout the life of the plant, even under peacetime operation, and actual experience will generally determine reasonable margins to ensure full output over a range of conditions.

Broader Specification Basis

The basis on which boiler specifications are drawn up should be broadened in two ways. In the first place, besides stating the operating conditions of evaporation, fuel analysis, pressures and temperatures, some of the broader bases of design should be laid down, *i.e.*, some of the leading boiler particulars and auxiliary capacities, on which output so largely depends, so that there is at least some degree of uniformity as between different makes.

These conditions are not peculiar to a particular type or make of boiler, but depend on performance details and resulting combustion conditions. Thus, a particular set of performance conditions will require a definite amount of combustion air and will produce a given quantity of flue gases. Once these are worked out (by completely straightforward methods) the precise capacities of the forced- and induced-draught fans and, what is especially important, the margins above these capacities to cater for adverse conditions, can be laid down in the specification. The heat release can be worked out and the furnace volume specified; similarly the calculated fuel consumption will enable a grate area to be fixed, based on a low rating per sq. ft. or the capacity of the pulverisers can be laid down and suitable spare capacity chosen.

Procedure and standards could be formulated from which any power-station staff could determine the principal design features. Even better, the main features could be laid down by a central committee which could agree on the standard and margins to be adopted. It is a moot point whether a B.S. Specification could be drawn up on these lines, but at least some limited agreement should be possible.

Boiler Fuels

The second way in which specifications could be broadened is in respect of fuel description. Arising partly, one must suppose, from the specification wording, most boilers have been designed in the past for particular grades of fuel. Although no boiler can run successfully on fuels ranging from anthracite to brown coal it is important to ensure that it will do so on a wide range.

The fallacy of conventional methods of specifying performance has been shown by experience over the last few years, when power stations have had to burn any and every type of coal, but even in normal times no boiler plant can be expected to receive particular grades of coal over the whole of its useful life of some fifteen to twenty years. It is greatly to the advantage of the undertaking to be able to choose coals at will from the most favourable market, balancing the overall running costs and lower performance obtained with cheap low-grade fuels against the higher efficiencies with more expensive coals.

Power stations in the past have been built expressly to accept the unwanted leavings of the coal market, and it is anomalous that their owners should now, as a result of higher ratings and their attendant troubles, be forced to look around for special grades of coal to maintain efficient and continuous operation. Nevertheless, modern boilers, if designed accordingly, are capable of dealing successfully with wide ranges of fuel, of which full advantage should be taken.

Collaboration between the various interests is needed in order to establish some kinds of standards which will result in a design sufficiently liberal to ensure the output desired, over a wide range of coals.

A step in this direction would be the adoption of a convention based on the worst type of fuel with which boilers would normally be expected to deal.

A boiler designed to burn a good coal of high calorific value will suffer in performance if only a low-grade coal is available. Design should, therefore, be based on a hypothetical low-grade coal, an analysis of which might include details of the following order:—Gross calorific value, 9,000 BThU per lb.; ash content, 20 per cent.; volatiles, 15 to 40 per cent.

This suggestion would not result in any radical departures from current practice. It would only mean that the boiler and its auxiliaries would be, in some respects, larger than if the design were based on, say, 14,000-BThU coal. The grate area or the capacity of the pulverising plant would be greater. The furnace volume would be adequate for the particular heat input and the extent of water cooling would be carefully determined. Apart from this, modern combustion appliances can now deal with very wide variations in the quality of fuel, provided the boiler design is in other directions adequate.

A great deal of further study and formulation of practice based on such study remain to be done before maximum and uniform availability is achieved.

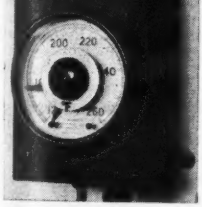
RECENT INTRODUCTIONS

Notes on New Electrical and Allied Products

Temperature Regulators

A RELATIVELY inexpensive regulator for automatically controlling temperature within the limits of minus 10 and plus 1,100 deg. F. is announced by the CAMBRIDGE INSTRUMENT CO., LTD., 13, Grosvenor Place, S.W.1.

It is particularly applicable to moulding platens, or developing and oil baths, the input of heat being adjusted by a self-contained tilting mercury switch actuated by adjustable contacts incorporated in a 4-in. dial thermometer. While the contacts carry very little current, the switch (AC or DC) is capable of dealing with up to 15 A at up to 250 V. The rectangular metal case of the regulator is provided with appropriate load and supply terminals so that separate accessories, or external contactors and relays, are not needed.



Pre-setting automatic thermometer regulator

The controlling bulb, which is inserted in the platen, tank, or oven being heated, is connected to the pointer mechanism by a flexible tube, thus enabling the dial to be placed up to 100 ft. away if desired.

The adjustable dial contact is spring mounted on a movable red index, which is pre-set by a detachable key to the temperature it is desired to maintain, the position of the mercury switch being indicated by a coloured " flag " through a small window above the dial.

The instrument is compact, having the advantage that faulty internal wiring will cause the actuating contact to remain open, so preventing damage by overheating to the process being controlled.

A similar regulator can be supplied with its contacts arranged to actuate a small solenoid valve for controlling the temperature of gas-heated devices, including lead cable injecting machines.

Watertight Switches

A range of ironclad switches and switch-fuses, specially designed to be watertight for mounting outdoors on dock wharves and aboard ships, or in railway yards, where they may be exposed to splashing, has been announced by SIEMENS ELECTRIC LAMPS & SUPPLIES, LTD., 38, Upper Thames Street, London, E.C.4.

The switches are available in 30, 60, 100 and 250 A at 500 V ratings, all more than complying with BSS.861–1939 for they are tested by immersion for 15 minutes in 12 ft. of water, which is equivalent to a pressure of 5·2 lb. per sq. in.

Watertight switch and fuse box

In the triple-pole model the fuses are mounted above the switch mechanism in the usual manner, whereas in the double-pole pattern they are alongside each other so as to allow the box to be bolted directly to the underside or top of a busbar chamber; alternatively, a cable sealing chamber can be substituted for the removable top and bottom covering plates of the box.

The jumper connections between switch and fuses are reversible to allow for cable entry at the top or bottom. The fuses are of the " Duplex " pattern, either rewirable or cartridge link carriers being supplied, or the " Zed " type can be fitted if preferred.

Post-War Electricity Supply

Statement on the General Position

VARIOUS bodies have issued proposals relating to the future of electricity supply. The general position in regard to the leading organisations has been set out in a statement prepared for the Greater London, S.E. and E. England Centre of the Association of Municipal Electrical Engineers by Mr. F. S. Naylor, borough electrical engineer and manager, Southwark.

The subject is considered in two aspects, *viz.*, reconstruction of the supply industry and electrical installations in post-war houses. The former is in two parts—political (form of ownership and control) and technical (standardisation of system and voltage and of tariffs). The aspect of reconstruction was the one on which the Minister of Fuel and Power, acting through the Electricity Commissioners, requested a report from the Joint Committee of Electricity Supply Associations. The subject has been considered separately by municipal and company undertakings, but while there are grounds for hope of agreement between the two interests on some matters, divergencies of view are apparent on the question of ownership and control.

Consequent upon the delay, the London and Home Counties Joint Electricity Authority submitted to the Minister its own proposals (March, 1943). These proposals were rejected by the Conference of Local Authorities Owning Electricity Undertakings in Greater London at its annual meeting in July, at which proposals were made for dealing with the matter nationally.*

In regard to the second aspect, matters relating to installations are being handled by the Ministry of Works (Directorate of Post-War Planning) and in this connection various committees have been set up. The three that are relevant to the present purpose are the Lighting, Heating and Ventilation and Electrical Installations Committees. The first two are convened by the Building Research Station. Dr. C. C. Paterson is chairman of the Lighting Committee, which includes Messrs. R. O. Ackerley, J. S. Dow and P. Good, and Professor A. C. G. Egerton is chairman of the other, which includes Sir John Kennedy, Sir Leonard Pearce and Messrs. A. C. Cramb, A. C. Pallott and W. M. Selvey. The Electrical Installations Committee is convened by the Institution of Electrical Engineers and is presided over by Mr. J. R. Beard.

Of the various Post-War Planning Sub-Committees of the I.E.E., only No. 3 covers electricity supply, distribution and installations. It has set up panels to investigate standardisation of voltages and systems, availability of supply and service arrangements, question of Government control and simplified regulations in regard to electrical equipment of buildings, standards of equipment and lighting and forms of tariff. The work of the panels dealing with availability and service and with equipment and lighting has been taken over by the Electrical Installations Committee (M.o.W.) which has produced draft reports on electricity used in small houses, flats and schools, in large buildings and in farm buildings, and also on telecommunications in buildings of all types.

A request for a report (by August 20th) on the planning of the gas industry was made by the Minister of Fuel and Power to the British Gas Federation, failing which the Minister would prepare the report. Both municipal and company representatives have requested an extension of time with a view to making attempts to decide questions regarding ownership and control.

* More recently (*Electrical Review*, August 6th) the Electrical Power Engineers' Association has drawn up a report on the subject.—Eds., *Electrical Review*.

Forthcoming Events

Institution of Electronics.—Saturday, September 18th, 3 p.m. Royal Society of Arts, John Adam Street, Adelphi, W.C.2. Lecture on "Recent Developments in Luminescence, with particular reference to Discharge Lamps," by Mr. A. H. McKeag, M.Sc.

Association of Public Lighting Engineers.—Wednesday and Thursday, September 22nd and 23rd. Institution of Mechanical Engineers, Storey's Gate, S.W.1. Two-day conference.

Association of Mining Electrical and Mechanical Engineers.—*Yorkshire North-West and South-East Branches.*—Saturday, September 25th, 3.30 p.m. Doncaster Technical College. Address by Mr. W. H. Littlewood.

Institute of Fuel.—Thursday, September 30th, 5.30 p.m. I.E.E. Lecture Theatre, Savoy Place, W.C.2. Paper: "The Rational Preparation of Coal," by Dr. R. Lessing.

Association of Supervising Electrical Engineers.—*Manchester Branch.*—Saturday, September 18th, 4 p.m. Engineers' Club, Albert Square. Address by Mr. C. R. Goldring on "Hydro-electric Power in Canada."

University of London.—Tuesday, September 21st, 5.30 p.m. Institution of Electrical Engineers, Savoy Place, London, W.C.2. First of three lectures on "Engineering Economics," by Sir Frank Gill, K.C.M.G., O.B.E.

Junior Institution of Engineers.—Friday, September 24th, 6.30 p.m. 39, Victoria Street, London, S.W.1. Paper on "Daylight Illumination of Factories," by Mr. P. J. Waldram.

COMMERCE and INDUSTRY

More Men for Forces. Prevention of Electrical Accidents.

Calling up of Deferred Men

IN view of the urgent need for men in the Forces, the Government has decided that deferments granted for men in certain occupations who were born in or after 1915, 1910 or 1905, as the case may be, must be brought to an end. It is appreciated that this may cause some difficulty, but the Government is confident that at this stage of the war employers will do their utmost to ensure that the men required are set free for the Forces. Before any of them are called up, however, their employers will be given an opportunity of indicating for which men they need substitutes. Where it is agreed by the District Man Power Board that a substitute is needed, the man concerned will not be called up until a substitute has been supplied. It is particularly desired that employers should not enter into correspondence at this stage regarding individuals affected by this decision. Employers will be communicated with before calling up action is taken.

Overseas Standards

Copies of standard specifications recently received from overseas which may be inspected at, or obtained on loan from, the British Standards Institution, 28, Victoria Street, London, S.W.1, include the following:—

Canada (*C.E.S.A.*) C. 83—1942, pole line hardware, revised drawings B–5 and B–7, thimble eye bolts.

New Zealand (B.Z.S.S.E.100), battery containers for carbon-type hearing aids.

U.S.A. (Federal Spec.), J.C.138 cable and wire, varnished cloth insulated, 0 to 5,000 V service; W.T. 631 transformers, W.F. 805 enclosed cartridge fuses, W.F. 803A renewable enclosed cartridge fuses; W.S. 896 snap switches, single unit, interchangeable flush type with wall plates.

Decorated Lampshades

Traders are reminded that manufacturers have been prohibited from supplying all types of decorated lampshades since August 1st, 1942, under the Limitation of Supplies (Miscellaneous) Orders, Nos. 16, 19 and 21; the Board of Trade would be grateful for the co-operation of wholesalers and retailers in bringing these regulations to the notice of any small manufacturers who may not be aware of the position. Only a very small number of persons have, on special grounds of hardship, been authorised to continue to make decorated lampshades and any manufacturer who offers them for sale should hold a Board of Trade licence to supply prohibited types.

The prohibition covers all types of applied decoration including those which are "crackled" or have stencilled designs, but does not apply to shades which are sprayed in one plain colour. Fringes and similar decorations are prohibited, but shades may be attached to the frame by braid, bastband, cord or gummed paper.

A Carnival Lorry

Among the attractions of a recent holiday week at Redditch was a carnival procession in which a number of local industries took part.

The prize-winning lorry of Britannia Batteries, Ltd., in a local carnival procession

In the accompanying illustration we show the lorry entered by Britannia Batteries, Ltd., which was awarded the second prize.

Warning to Post-war Planners

A warning to would-be legislators and others that any steps taken to prevent or hinder electrical development or electrical science might deny this generation and the next of benefits of electricity unknown to-day was given last week by Mr. V. W. Dale, assistant director and secretary of the British Electrical Development Association, at a one-day conference for senior demonstrators arranged jointly by E.D.A. and the Electrical Association for Women at the latter's headquarters. Electricity, said Mr. Dale, was at the present time getting mixed up with high politics, or perhaps *vice versa*. In the past the supply of electricity had suffered through shortsighted but forgivable mistakes. Despite these mistakes it had progressed very favourably, nearly ten million consumers being connected between the two wars. He was sometimes alarmed at the thought of what might have happened if the artificial barriers to progress being talked of to-day had been introduced

say ten, twenty, thirty, or forty years ago. Still more was he concerned with what might be called our "invisible inheritance," the wants so far unfulfilled. No steps must be taken that might interfere with anticipated developments.

The remarkable attendance at the conference, Mr. Dale said, was an indication of the high sense of responsibility of the demonstrators who after the war would have a much wider field of activity to cover. The title "electrical demonstrators" would probably have to be changed one day to accord with the altered status.

The principal subject under discussion at the conference was vegetables. Miss Caroline Haslett, director of the E.A.W., speaking on "Vegetables for Good Health," stressed the important connection between gardening and cooking, and asked demonstrators to do their best to make vegetables fashionable. Other speakers were Miss Ena M. Eaves, Miss Willans and Miss Minoprio.

Measuring-Instrument Exhibition

Progress in the design of precision measuring instruments was demonstrated at an exhibition held in the Manchester Corporation Electricity Showrooms from September 8th to 15th. It was arranged by E. H. Jones (Machine Tools), Ltd., and was intended for the benefit of engineers, production executives, chief inspectors, etc., of engineering units in the North of England. New instruments on view (since the last demonstration in Birmingham) were: A special apparatus which enables blind operators to check components to very close limits of accuracy; a Sigma super comparator with remote control cabinet; a Sigma taper measuring machine; a Brisdon inspection table; and a Papworth sine table.

Audible-signal comparator being operated by a blind person

Much interest was taken in the audible-signal comparator which was shown operated by a blind person. Instead of coloured light signals, high and low pitched bells are used to distinguish components which exceed plus or minus tolerances, both bells ringing together if the gauge is correct. The super vertical optical comparator for the inspection of gauges has a magnification of 10,000 to 1 and is capable of detecting differences of one-millionth of an inch. The taper measuring machine, although primarily designed for direct reading, can be used for the slip and roller method of checking; it eliminates the use of slip gauges and rollers and gives diameter readings at measurable intervals.

Councillor Hilder Strange, who opened the exhibition, said that the precision instruments displayed were a great tribute to the progress made in this branch of engineering. We had in this country at the beginning of the war the foundation of an instrument manufacturing industry and thus it was that practically a new industry arose. The British engineer had undoubtedly triumphed and at the same time had wrested a virtual monopoly from Germany.

Mr. E. J. M. Jones, deputising for his father, Mr. E. H. Jones, who is convalescing after a long illness, spoke appreciatively of the help given by the Manchester Corporation Electricity Department in the staging of the exhibition. Mr. Sidney Player (chairman, Newall Engineering Co., Ltd., and Optical Measuring Tools, Ltd.), said that the production of the range of equipment exhibited had been a difficult job, but the results were pleasing. No one was really satisfied as there was so much work yet to do, but they felt they were operating on the right lines. There was much in the exhibition to interest the student of to-day, who was the engineer and executive of to-morrow. The Lord Mayor of Manchester (Alderman J. S. Hill, J.P.) presided at the opening ceremony.

The Henley Education Scheme

In 1942 W. T. Henley's Telegraph Works Co., Ltd., inaugurated an education scheme to help boys in the company's employ to secure the most suitable positions appropriate to their ability and personality. Details of the scheme were published in the *Electrical Review* of December 25th, 1942. The company has now prepared a well-produced and illustrated booklet, "Henley Student Manual," in which the education scheme is fully described. A copy of this booklet is given to each boy as he joins the company.

Safety Training Exhibition

Indications of ways in which electrical accidents occur and how they can be prevented are given at a "Safety Training Exhibition" which closes to-day (Friday) at Dorland Hall, Regent Street, W.1. One somewhat gruesome exhibit shows actual apparatus that has caused fatal accidents—a bakelite lampholder exposed to corrosive fumes, improper connectors, temporary connections, faulty leads, temporary lighting arrangements, and a feather duster used for cleaning a high-voltage switchboard.

A model demonstrated how the dangers of glare in factories can be avoided, while photographs stressed the importance of the use of flameproof electrical apparatus in mines. Actual apparatus as used on the railways showed how

electric train controllers, automatic train stopping devices and colour light signalling operate, and there was a model depicting interlocking block telegraph instruments and the control of signals.

The best position for portable radiators in bedrooms, bathrooms, etc., to avoid risk of shock or setting fire to curtains, bedding, etc.; the importance of using three-pin plugs; the prevention of eyestrain and resulting accidents by installing good lighting; the safe drying of clothes by employing electric dryers; and the enclosing of fuseboards and meters in cupboards were other hints given by means of specimen appliances or photographs.

Fatalities

A journeyman electrician, Francis William Williams, aged thirty, of St. Augustine's, received a fatal electric shock while working on the bridge of a ship, and at the inquest held at Bristol last week a verdict of " Accidental death owing to an electrical plug not being properly connected " was recorded. Mr. H. J. Jenkins, foreman electrician of Charles Hill & Son, said that deceased came to him to say that a cable was damaged on the ship and asked for a soldering iron to repair it. About a quarter of an hour later witness was told of the accident. He could only assume that deceased had wrongly connected the red and brown leads of the soldering iron, causing the outer casing to become electrified. The switch-plug had not been properly connected to the iron.

While working on a transformer stage William Shute, aged forty-seven, a maintenance millwright employed at the English Electric Co.'s works at Stafford, came into contact with a live transformer and was killed. Two fellow workmen who tried to pull him away received slight shocks. At the inquest a verdict of " Accidental death " was returned.

The Gauge and Tool Makers' Meeting

The first annual general meeting of the Gauge and Tool Makers' Association was held at St. Ermin's Hotel, London, on September 1st, when Mr. F. W. Halliwell, M.I.Mech.E., chairman of the Association, presided.

There was a large attendance, and the president, Mr. H. H. Harley, C.B.E., in extending a cordial welcome to the members present, said it was gratifying to see the steadily increasing number of firms prepared to support the central organisation of their industry.

It was satisfactory to find that the Ministries were making increasing use of the Association as a means of ascertaining manufacturing capability and capacity in the case of specially urgent and complicated requirements, and he recommended all members to send the secretary particulars of the scope of their plant and the type and amount of work they were in a position to undertake, so that a Register might be compiled for the guidance of the Council when these urgent inquiries came along. One of the primary objects of the Association as it developed would be to promote a spirit of co-operation and good faith throughout the industry, to encourage discipline and loyalty amongst the members, and to foster craftsmanship.

Mr. Halliwell, in proposing the adoption of the report upon the activities of the Association during its first year, said that the Council had been concerned to secure recognition of the vital nature of the gauge and tool-making industry in regard to any manufacturing programme. Progress in this direction had already been made, and a memorandum dealing with the labour situation in the industry was submitted by the Council to Sir Percy Mills, Controller-General of Machine Tools, Ministry of Supply, last January. Negotiations were proceeding, and members were feeling the benefit of these efforts. It was also the desire of the Council to ensure that the Association had adequate representation at the proper level in the pyramidal structure of trade organisations and federations which was now rapidly taking shape, and this matter was under constant consideration.

The honorary treasurer, Captain C. R. Cook, said that the Association had acquired and equipped a suite of offices at Standbrook House, Old Bond Street, and the Council hoped the members would take advantage of the facilities available and make use of the Council Room.

The first meeting of the new Council was held immediately after the annual meeting, and the president, chairman, vice-chairman and hon. treasurer were unanimously re-elected.

Contract Price Adjustment Formulæ

The latest figures for use in the B.E.A.M.A. contract price adjustment formulæ are as follows: (a) " Rates of Pay."—The rate of pay for adult male labour at September 11th shall be deemed to be 86s. 6d. (no change). (b) " Costs of Material."—The index figure for intermediate products last published by the Board of Trade on September 11th is 171·8 and is the figure for the month of August. The figure for July was 171·4.

Instrument Dials

Examples of nameplates and instrument dials produced by the Kodak sensitising process are included in the display at the eighty-eighth exhibition of the Royal Photographic Society at 16, Prince's Gate, London, S.W.7. The great strides that have taken place in colour photography are also demonstrated, as well as the application of photography to airgraph letters and mass miniature radiography.

Television Prospects

Mr. Ralph R. Beal, research director of the Radio Corporation of America, stated last week that television would be ready for every family immediately after the war.

He said that home receiving sets in any desired size, with screens varying 6 in. to 24 in. wide, would be available as soon as the radio manufacturing industry was reconverted from war to peace production.—*Reuter.*

Canadian Electrical Appliance Restrictions

Restrictions were placed on the manufacture and sale of commercial electrical cooking equipment and commercial electrical appliances in Canada in a Wartime Prices and Trade Board Order No. A-782, issued by Mr. A. L. Brown, Administrator of Electrical Equipment and Supplies. This is similar to controls already set up in the United States. Except for the Departments of Munitions and Supply,

National Defence or Pensions and Health, no one may manufacture, without the written permission of the administration, any of the following: Baking ovens, barbecue machines, broilers, dishwashers, doughnut machines, egg boilers, fryers, griddles, nut blanching ovens, nut roasters, ovens (except built-in types), popcorn machines, roasters, sandwich toasters, steamers, stoves for glass coffee makers, toasters, urns, waffle irons and warmers.

Public Transport Association

Already 318 members owning nearly 40,000 public service vehicles have joined the newly-formed Public Transport Association whose first annual meeting was held in London on Thursday last week. Among the first work of the Association has been the submission of the memoranda to the Ministry of War Transport's committees on traffic signs and on the design and layout of roads in built-up areas. In the first it is proposed, among other things, that signs for the control of all forms of traffic should be standardised; place names should be used instead of numbers; the responsibility for the erection and maintenance of all signs should be that of one authority; and all signs should be capable of being easily read from a moving vehicle, both by day and night. On the layout of roads it is submitted that central lighting standards in the highway should be avoided, except at crossing places where a proper refuge can be provided; and that traffic lights should all be of the vehicle-actuated type. Proposals for amendment of the specifications covering the overall length, width, height and weight of public service vehicles are being considered by the technical committee of representatives of the Society of Motor Manufacturers and Traders and the operators. The Association is approaching the Ministries of War Transport and Labour and National Service on the question of supply of directed labour and is making representations for the reservation of all employees in the transport industry.

Domestic Lighting

Artificial illumination in the home was the subject of a talk by Mr. J. B. Harris at a Housing and Health Exhibition held in the Pump Room at Bath from September 6th to 11th. Mr. Harris dealt with some of the fundamentals involved in a general way, illustrating his remarks with lantern slides. The Bath-Bristol Centre of the Illuminating Engineering Society contributed an exhibition of photographs depicting modern home lighting practice together with samples of recommended domestic fittings.

A Lamp Price Card

Thorn Electrical Industries has sent us a price card available for the use of counter assistants, showing the retail prices and purchase tax of the more popular types of "Atlas" lamps.

"Electrician" Annual Tables

Over two years have passed since the last publication of the *Electrician* "Annual Tables of Electricity Undertakings," and there has been a growing call for a new edition, now met by the issue of the 54th, for 1943-44. So far as is possible in present circumstances the work has been thoroughly done. The tables contain information on electricity supply of the kind which it is permissible to publish, in a compact form of great value to many classes of business men, engineers and officials.

The British undertakings' table has been extensively revised but great difficulties have prevented an equally widespread revision of the Empire and Foreign data. These cover the whole world outside the United Kingdom, and it has been necessary to exclude from them enemy centres and places in enemy occupation. Nevertheless, the Dominion and Colonial portion records certain recent changes. The book, which is published by Ernest Benn, Ltd., Bouverie House 154-160, Fleet Street, London, E.C.4 (12s. 6d.), is issued this year in handier and paper-saving format.

Birmingham Electric Club

On Monday, September 20th, the Birmingham Electric Club opens its new session with a tea and reunion at the Grand Hotel at 5.30 p.m. At 6 p.m. Mr. A. M. Fletcher is to deliver his presidential address.

TRADE MARK APPLICATIONS

THE following applications have been made for British trade marks. Objections may be entered within a month from September 8th.

MIRROPHONIC MASTER. No. 619,448, Class 9. Reproducing apparatus for sound films. Western Electric Co., Ltd., Ltd., 2-6, West Street, Upper Street, Martin's Lane, London, W.C.2.

AEROTEK. No. 623,674, Class 9. Radio-telephonic, radio-telegraphic and television apparatus, and parts thereof not included in other classes. Notek Electric Co., Ltd., 23, London Road, Bromley, Kent.

ASCO. No. 623,388, Class 11. Electric incandescent lamps (ordinary). Elizabeth Legge Stuart, trading as the Accessory Supply Co., 54, Gordon Street, Glasgow, C.1.

KLEEWARE. No. B623,418, Class 17. Articles not included in other classes made of vulcanised rubber or of vulcanised synthetic rubber. O. & M. Kleemann, Ltd., 158/162, Oxford Street, London, W.1. To be associated with No. B619,557.

INFORMATION DEPARTMENT

GENERAL inquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by our Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Our extensive records enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the makers of the following:—

NOBBY starter.

Electrical Commodities, Ltd., or who are handling their products.

ELECTRICITY SUPPLY

Covent Garden Lighting. Scottish Conference.

London.—COVENT GARDEN MARKET LIGHTING.—The Traffic and Lighting Committee of the Westminster City Council reports that the Government Departments concerned hold the view that improved lighting is necessary in the Covent Garden area to facilitate handling and dispatch of market produce. Experiments have been undertaken to ascertain the degree of additional lighting to be provided, and the Ministry of War Transport has now asked the Council to arrange for the installation and maintenance of additional lighting of 0·002 ft.-candles in streets surrounding the market.

The city engineer has obtained tenders from the Gas Light & Coke Co. and Central London Electricity, Ltd., and although the gas tender is lower, the Traffic Lighting Committee states that the electrical system is to be preferred having regard to the facility with which it can be extinguished when occasion requires.

The special industrial lighting will be in addition to the public lighting which, in this area, is by gas and it is reported that the Gas Company will not object to the proposed installation being electric. The market authorities have expressed the view that the scheme should apply also to the central covered portion of the market itself and the Ministry agrees to this being included. The cost is estimated at £6,000 and £270 per annum.

Scotland.—CONFERENCE ON HYDRO-ELECTRIC SCHEME.—Eighty representatives of burgh and county councils in the area affected by the Hydro-Electric Development Act attended a conference convened by Inverness Town Council on September 9th, Provost Hugh MacKenzie, Inverness, presiding. Sir Murdoch Macdonald, M.P. for Inverness, explained the effect of the Act in the Highland area and urged local authorities to combine in formulating schemes of social and economic advantage to the area, in which the new North of Scotland Hydro-Electric Board could collaborate.

It was unanimously agreed by the conference to set up a committee of seven members to look after the interests of the area affected by the Act, and to make suggestions to the Board. It was argued in the course of the discussion that what was wanted was a committee which would have official recognition by Government Departments. On the suggestion of Provost MacKenzie, it was agreed to recommend the Government to place the administrative offices of the Board somewhere in the Highland area.

The names of the chairman and other members of the Board are to be announced by the Secretary of State for Scotland when Parliament reassembles. Four of the members, including the chairman and vice-chairman, have been appointed jointly by Mr. Johnston and the Minister of Fuel. The fifth is a member of and is appointed by the Central Electricity Board. It is reported but not confirmed that Lord Cooper will be chairman.

Southport.—FRINGE ORDER.—Application is being made by the Electricity Committee for a Fringe Order to supply electricity to Andersons Farm.

Scarborough.—LOAN.—The Electricity Committee is seeking sanction to borrow £1,200 for substation equipment.

Ware.—STREET LIGHTING.—The surveyor reported to the Urban District Council recently that he had been in negotiation with the Northmet Power Co. regarding the possibility of installing "starlight" lamps, and it was proposed that 29 should be erected. A subcommittee was appointed to view an existing installation in a nearby town.

TRANSPORT

Belfast.—CURIOUS TROLLEY-BUS ACCIDENT.—An unusual accident occurred in Belfast on September 7th. A trolley-bus, fouling the span connecting two tramway standards at the junction of Ormeau Road with Rossmore Avenue, caused a short-circuit which fractured a gas main. The gas ignited in four service pipes, and the bathroom and attic of one house were set on fire.

SUBSTITUTION SCHEME POSTPONED.—A scheme for the abandonment of the Bloomfield tramway section and the substitution of a trolley-bus service has been postponed until after the war.

Bristol.—COST OF REMOVING TRAM RAILS.—After the city engineer had reported that it would cost £96,000 to recover tram rails (valued at £47,000) which are set in asphalt or concrete, the Public Works Maintenance Committee decided to inform the Ministry of Supply that on the present price basis the Committee could not undertake the recovery of such rails. It agreed, however, to continue to salvage rails in setts.

Glasgow.—PART-TIME EMPLOYEES.—Sickness and absenteeism among the operating staffs of the Transport Department have resulted in large curtailments in services, and to meet the difficulties being experienced, the transport manager, Mr. E. R. L. Fitzpayne, has been instructed to extend the employment of part-time workers. Reporting to the committee, the manager stated that during the third week in August there was an average week-day shortage in staff of 490 employees. On one day 239 trams and nine buses had to be withdrawn from service on account of the absence of employees. During July the number of productive hours lost by the absences of staff was 135,481.

Institute of Welding

THE first meeting of the Institute of Welding for the present session was to be held yesterday (Thursday), the subject being "Classification of Arc Welding Electrodes," by Mr. G. F. Clipsham, B.Sc. Tech. The next meeting takes place on Wednesday, October 13th (5.30 p.m.) at the Conway Hall, Red Lion Square, Holborn, W.C.1, when a paper on "Some Aspects of Machine Design" will be presented by Mr. E. Hassler. A number of informal discussion meetings have been arranged for the winter months at technical institutes in various parts of London.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

The Victoria Falls & Transvaal Power Co., Ltd.—In our last issue we gave the main figures of the accounts of this company for 1942. We have now received a copy of the report and accounts which contain further particulars. The report states that sales of electricity during the year showed a small increase over those of the previous year, but the sales for the first seven months of the current year are on a slightly lower level than those for 1942. The work on the two large power stations, referred to in last year's report, has progressed as well as wartime circumstances have permitted and the boiler house and boilers at the larger of the two stations should be completed this year. In the case of the other station it will not be possible to complete the work this year as anticipated, but it is expected that the station will come into commission in the early part of next year.

In his statement which accompanies the report and accounts, Mr. A. E. Hadley (chairman and managing director) says that the sales of power throughout the year were very consistent with the results of the previous year, the slight improvement amounting to 1·7 per cent. In view of the continued demand both for labour and materials for war purposes, the steadiness of the gold mining industry can be viewed with satisfaction. During the present year this activity has been practically maintained, the sales having been at a slightly lower rate, but the tendency at the moment suggests a small upward movement.

Telephone Rentals, Ltd.—Presiding at the annual meeting on September 13th, Mr. F. T. Jackson (chairman and joint managing director), said that during the year under review they were able to maintain a volume of new business comparable with that done during the previous year. He thought that 1942 would have been a record year except that they had great difficulties as it was now necessary for any concern requiring one of their telephone installations to obtain a licence from the Board of Trade. According to their experience up to date very few licences were being granted; the policy of the Board of Trade appeared to be to refuse licences to everybody applying for them. By forcing a war factory to rely wholly on manually operated switchboards the factory's effective output was reduced by at least 10 per cent.

The Electric Furnace Co., Ltd., reports a net profit for the year ended March 31st of £54,544, as compared with £50,821 for the preceding year, to which is added £6,681 dividends receivable from subsidiary companies and £3,325 brought in. After deducting directors' remuneration voted at the last annual meeting, the balance available is £63,221. A second ordinary interim dividend of 4½ per cent., actual, was paid, on July 1st, making 8 per cent. for the year (same), and after providing £32,000 for E.P.T. and income tax on current profits, and placing £10,000 to general reserve, the balance carried forward (subject to directors' remuneration) is £8,121.

The Wolseley Sheep Shearing Co., Ltd., reports a trading profit for 1942, after provision for tax, of £17,731, as compared with £18,990 for the previous year and, after deducting directors' fees and depreciation, the net profit is £8,308 (against £9,268). The dividend for the year is 12½ per cent., less tax (against 12 per cent.), and the balance carried forward is £19,546 (against £17,488 brought in).

The Compania Hispano-Americana de Electricidad (Barcelona) reports net profits for 1942-43 of 19,611,715 gold pesetas, as compared with 24,069,073 gold pesetas in the previous year. This decrease is stated to have been mainly due to the reduced dividend distribution of the Compania Argentina de Electricidad for the year 1942. The Compania Hispano-Americana proposes to pay 40 Argentine pesos on the A, B and C shares and 8 on the D and E shares, as compared with 60 and 12 pesos, respectively, for 1941-42. The balance carried forward is 11,924,718 gold pesetas, against 10,435,825 brought in.

The Scottish Power Co. is raising its interim ordinary dividend from 2½ to 3 per cent. The company states, however, that the increase should not be taken to indicate that there will be an increase in the total dividend for the year. The final dividend for 1942 was 5½ per cent.

Richard Johnson, Clapham & Morris, Ltd., have announced a final dividend on the ordinary shares of 11¼ per cent., maintaining the distribution for the year at 15 per cent. A final dividend of 1 per cent. (unchanged) is also paid on the participating preference shares, again making 7 per cent. for the year.

The Midland Electric Corporation for Power Distribution, Ltd., has announced an interim dividend of 3 per cent. (unchanged).

The Electric Supply Corporation, Ltd., announces an interim dividend of 3½ per cent., the same as last year.

The Bournemouth & Poole Electricity Supply Co., Ltd., is paying an interim ordinary dividend of 5 per cent. (unchanged).

The Automatic Telephone & Electric Co., Ltd., is again paying an interim ordinary dividend of 3 per cent.

The British Oxygen Co., Ltd., is paying an interim ordinary dividend of 7 per cent., less tax (unchanged).

British Insulated Cables, Ltd., has announced an unchanged interim dividend of 5 per cent.

Lancashire Dynamo & Crypto, Ltd., is maintaining its interim dividend at 5 per cent.

Enfield Cable Works, Ltd., is again paying an interim dividend of 6¼ per cent.

A. Reyrolle & Co., Ltd., is making the usual interim distribution of 5 per cent. on the ordinary shares.

Walsall Conduits, Ltd., is paying an interim dividend of 20 per cent. (same).

The Lancashire United Transport & Power Co., Ltd., has declared an interim dividend of 4 per cent. (unchanged).

New Companies

Hart & Williamson, Ltd.—Private company. Registered August 26th. Capital, £1,000. Objects: To carry on the business of electrical, chemical, radiological, surgical, acoustic, marine, domestic and general engineers, etc. Directors: F. A. Hart, 7, Laurel Drive, The Spinney, Winchmore Hill, N.21, and W. G. Williamson, 139, Green Dragon Lane, Winchmore Hill, N.21. Registered office: Farm Road, Winchmore Hill, N.21.

Howell Williams Refrigeration, Ltd.—Private company. Registered August 28th. Capital, £1,000. Objects: To acquire the business of a refrigeration engineer carried on by J. H. Williams at Glan Conway, Denbigh, and to carry on the business of refrigerating, electrical and general engineers, etc. Directors: J. H. Williams and Laura M. Williams, both of Radelek House, Glan Conway. Secretary and registered office: J. H. Hibbert, 12, Lloyd's Buildings, Llandudno.

Stable Arc Welding Co., Ltd.—Private company. Registered August 31st. Capital, £1,000. Objects: To carry on the business of welders, annealers, electro and chromium platers, polishers, metal workers, shipbuilders, shipwrights, mechanical, motor, electrical, marine and general engineers, etc. Directors: A. Sansom, 388, Ley Street, Ilford, and J. F. Johnson, 11, Elaine Avenue, Strood, Kent. Solicitors: Canter, Hellyer & Co., 201, South Street, Romford.

Phillips Omnipool, Ltd.—Private company. Registered August 31st. Capital, £1,000. Objects: To carry on the business of manufacturers of electrical goods, lamps, bulbs, valves, neon-signs, ultra-violet ray apparatus, radio and television instruments and parts, plastic articles, etc. Subscribers: H. W. Hulkes, 23, Wykeham Avenue, Hornchurch, Essex, and Nellie Symes, 36, Netherall Gardens, Hampstead, N.W.3. Secretary: N. Symes. Registered office: Clifford's Inn, Fleet Street, E.C.4.

Childwall Radio Co., Ltd.—Private company. Registered August 31st. Capital, £1,000. Objects: To carry on the business of wholesale and retail wireless distributors, manufacturers and dealers, manufacturers of, and dealers in, electric lamps, neon signs, refrigerators and electrical apparatus and accessories, etc. Directors: W. A. Roberts, 1, Belston Road, Liverpool, and J. A. Sutton, Woodcroft, The Nook, Gateacre, Liverpool. Registered office: 1, Belston Road, Liverpool, 16.

Romac Radio Corporation, Ltd.—Private company. Registered September 1st. Capital, £100. Objects: To carry on research work with a view to the improvement and exploitation of radio telegraphy and telephony, to carry on the business of wireless telegraphists, consulting and communication engineers, electricians, etc. Subscribers: P. F. Heyes, 5, Hamilton Gardens, Hockley, Essex, and Shirley Martin, 99, Manor Avenue, Brockley, S.E.4. Solicitors: Stafford Clark & Co., 3, Laurence Pountney Hill, E.C.4.

Company to be Struck Off Register

The name of the following company will be struck off the Register at the expiration of three months unless cause is shown to the contrary.—Lighting Installations, Ltd.

Companies' Returns

Statements of Capital

Prentice, Ltd.—Capital, £15,000 in £1 shares (5,000 ordinary, 5,000 preference "A," 5,000 preference "B"). Return dated December 28th, 1942 (filed April 16th, 1943). 5,000 ordinary, 4,800 preference "A" and 5,000 preference "B" shares taken up. £4,802 paid, £9,998 considered as paid. Mortgages and charges: Nil.

Allbright Electric Co., Ltd.—Capital, £20,000 in £1 shares. Return dated May 19th, 1943. All shares taken up. £14,000 paid. £6,000 considered as paid. Mortgages and charges: Nil.

Direct Spanish Telegraph Co., Ltd.—Capital, £95,000 in 13,000 ordinary and 6,000 preference shares of £5 each. Return dated April 13th, 1943. 12,931 ordinary and 6,000 preference shares taken up. £94,655 paid. Mortgages and charges: Nil.

Robson & Coleman, Ltd.—Capital, £3,500 in £1 shares. Return dated April 28th, 1943. 3,191 shares taken up. £1,835 paid. £1,356 considered as paid. Mortgages and charges: Nil.

Mortgages and Charges

White, Jacoby & Co., Ltd.—Debenture, charged on the company's undertaking and property, present and future, including uncalled capital, dated August 16th, 1943, to secure all moneys due or to become due from the company to Barclays Bank, Ltd.

British Diamix, Ltd.—Satisfaction in full on August 6th, 1943, of charge dated June 1st, 1943, and registered June 21st, 1943, securing all moneys due or to become due from the company to the National Bank, Ltd.

Liquidations

The Buell Combustion Co., Ltd.—Meetings on September 17th, pursuant to section 244 of the Companies Act, 1929, at 49, Moorgate, London, E.C.2, to receive an account of the winding-up by the liquidator, Mr. R. H. A. Neuschild.

Century Refrigeration (1938), Ltd., 12, Princes Street, Hanover Square, London, W.1.—Liquidator, Mr. P. Phillips, 76, New Cavendish Street, London, W.1, released June 30th.

Bankruptcies

D. G. Lee, electrician, 240B, Clapham Road, London, S.W.9.—Trustee, Mr. H. H. Gaine, Official Receiver, Bankruptcy Buildings, Carey Street, London, W.C.2, released September 2nd.

E. D. Atkinson, electro plater, carrying on business as "Electrocraft," 149, Emily Street, Highgate, Birmingham.—Trustee, Mr. R. K. Clark, Official Receiver, Somerset House, 37, Temple Street, Birmingham, released September 2nd.

H. J. Fowlie, electrical engineer, 40, Queen Street, Maidenhead, Berks. Trustee, Mr. J. B. Simmons, Official Receiver, 8, Forbury, Reading, released September 2nd.

STOCKS AND SHARES

TUESDAY EVENING.

THE brighter complexion thrown upon the war outlook by the capitulation of Italy is reflected in a number of the Stock Exchange markets. The effect is to be seen in a fairly general decline in the prices of gilt-edged securities, such, for instance, as those of the British Government list, Home railway prior-charge and similar stocks. To explain this, the argument is advanced that when the war is ended, the Government control over money conditions will probably be relaxed. The demand for capital, the argument continues, on behalf of industrial companies and others will be so pressing as to force up money rates, and render investment entirely dissatisfied with such yields as those shown by gilt-edged stocks and shares to-day. The Home railway market has followed the lines laid down by the gilt-edged group. Junior stocks, as well as those of the pre-ordinary type, have gone back. The movement has not extended so far to the preference shares of industrial companies nor to such front-rank ordinary shares as those in the Home electricity supply list. On the other hand, the drawing nearer of the end of the war is given as the reason for activity and better prices in radio shares.

Electricity Supply Shares

Price-changes in the ordinary shares of the Home electricity group can be counted on the fingers of one hand. Metropolitans are 6d. higher at 41s., British Light & Power, at 32s. 6d., have recovered the dividend deducted from the price, and added a further 6d. Rises, also of 6d. each, lifted North Easterns to 32s. 6d. and Isle of Thanet to 17s. 6d. Scottish Power ordinary shares are unchanged at 38s. on the declaration of an interim dividend of 3 per cent. This is an increase of ½ per cent. as compared with a year ago, but is not to be taken, say the directors, to indicate that there will be any increase in the total dividend for the year, which for nearly a decade has been 8 per cent. per annum. Removal of the previous fear of physical damage by enemy action to the companies' properties, has raised the ordinary shares of the front-rank undertakings to the status of gilt-edged investments. Occasionally a query arises as to what might be the possible effect of any movement towards nationalisation of the whole industry dealing with light and power. But nothing shakes the confidence of the investor in electricity supply shares, and week by week the rise goes on.

Equipment and Manufacturing

British Insulated Cables announces payment, on September 30th next, of the usual interim dividend of 5 per cent. on the ordinary capital. The price of the shares has gained 2s. 6d. and is up to 112s. 6d., the highest price touched since 1936. At 5⅛ the return is no more than £3 11s. 2d. per cent. on the money: Callender's at £5 yield 4 per cent. and Henley's at 25s. 6d. pay £3 18s. 6d. A rise of 3s. 9d., following upon another of 2s. 6d. last week, has lifted Ericsson Telephones to 53s. 9d. The buyers say that even if the dividend is not increased during the war, the financial strength of the company is such as to arouse expectation of some kind of bonus being distributed later on. Also, there is talk of a possible advance in the dividend. General Electrics hold to their advanced price of 90s. Automatic Telephones rose 9d. to 58s. 3d. after declaration of the usual interim dividend of 3 per cent. Siemens are 6d. up at 33s. 9d., and Falk Stadelmann at 32s. have put on 1s.

Radio

This week the principal activity in radio shares has been in Philco. The price, after dipping to 14s. 3d., was run up to 15s., from which there was again a slight reaction. E.M.I. have been a lively spot, the price showing 1s. rise to 28s. Cossor fluctuated between 24s. 6d. and 25s. At 24s. 9d. the price is ⅛ better. Following upon the strength of radio shares, a bout of buying occurred in the shares of cinema companies, the popularity of which is attributed to post-war prospects.

Miscellaneous Matters

Switchgear & Cowans are a florin higher at 18s., the yield at the recently-advanced dividend of 20 per cent. attracting attention. A good many shares came out, but the buying proved better than the selling and readily took all the shares that were offered. Another share that had been overlooked is Greenwood & Batley. Upon notice being drawn to the matter, the price advanced to 42s. 6d., against 38s. 6d. a month ago. Mather & Platt improved ⅛ to 52s. 6d. Burco at 15s. 9d. are 1s. higher and so are London Electric Wires at 32s. 6d. Telegraph Condensers, the price of which stood for months at 10s., are now 20s. Lancashire Dynamo repeats its previous interim dividend of 5 per cent., and Lancashire United Transport is paying an interim of 4 per cent. as before. No change has occurred in the price of either.

Victoria Falls

Victoria Falls & Transvaal Power ordinary shares were not affected by the issue of the report which showed a reduction in the revenue of £409,000 as compared with the previous year. The net profit comes out at £533,848, a reduction of £36,000. The dividend is maintained, as previously

(*Continued on page* 390)

ELECTRICAL INVESTMENTS

Prices, Dividends and Yields

Company	Dividend Previous	Dividend Last	Middle Price Sept. 14	Rise or Fall	Yield £ s. d.
Home Electricity Companies					
Bournemouth and Poole	12½	12½	58/-	..	4 6 2
British Power and Light	6	7	32/6xd	+9d.	4 6 2
City of London	7	7	28/-	..	5 0 0
Clyde Valley	8	8	39/6xd	+3d.	4 1 0
County of London	8	8	41/6	..	3 17 0
Edmundsons:					
7% Pref.	7	7	34/-	..	4 2 4
Ord.	6	6	28/6	..	4 4 3
Elec.Dis.Yorkshire	9	9	44/-	..	4 1 10
Elec. Fin. and Securities	12½	12½	52/-	..	4 16 1
Elec. Supply Corporation	10	10	46/-	..	4 7 0
Isle of Thanet	Nil	Nil	17/6	+6d.	—
Lancs. Light and Power	7½	7½	34/6	..	4 7 0
Llanelly Elec.	5½	6	25/6	..	4 14 1
Lond.Assoc.Electric	4	3	24/-	..	2 10 0
London Electric	6	6	26/6	..	4 10 7
London Power Red. Deb.	5	5	104½	..	4 15 7
Metropolitan E.S.	8	8	41/-	+6d.	3 18 0
Midland Counties	8	8	39/6	..	4 1 0
Mid. Elec. Power	9	9	43/-	..	4 3 9
Newcastle Elec.	7	7	31/-	..	4 10 5
North Eastern Elec.:					
Ordinary	7	7	32/6	+6d.	4 16 2
7% Pref.	7	7	34/6	..	4 1 2
Northampton	10	10	47/6	..	4 4 0
Notting Hill 6% Pref. (£10)	6	Nil	10	..	—
Northmet Power:					
Ordinary	7	7	38/-	..	3 13 8
6% Pref.	6	6	30/6	..	3 18 8
Richmond Elec.	6	6	26/-	..	4 12 4
Scottish Power	8	8	38/-	..	4 4 4
Southern Areas	5	5	22/-	..	4 10 11
South London	7	7	26/6	..	5 5 8
West Devon	5	5	23/6	..	4 5 0
West Glos.	4½	3½	24/-	..	2 18 4
Yorkshire Elec.	8	8	40/6	..	3 19 0
Overseas Electricity Companies					
Atlas Elec.	Nil	Nil	6/6	..	—
Calcutta Elec.	7*	6*	38/6	..	3 2 4
Cawnpore Elec.	10	10	34/-	..	5 17 8
East African Power	7	7	33/6	..	4 3 7
Jerusalem Elec.	7	5	30/6	..	3 5 7
Kalgoorlie (10/-)	5	5	10/-	..	5 0 0
Madras Elec.	6*	4*	25/-	..	—
Montreal Power	1½	1½	29½	..	5 1 8
Palestine Elec."A"	4*	5*	42/-	..	2 7 8
Perak Hydro-elec.	6	7	11/6	..	—
Shawinigan Power	83cts.	90cts.	19½	..	—
Tokyo Elec. 6%	6	6	22	..	—
Victoria Falls Power	15	15	4 4/5	..	3 9 7
WhitehallInv.Pref.	—	—	25/-	..	4 0 0

Company	Dividend Previous	Dividend Last	Middle Price Sept. 14	Rise or Fall	Yield £ s. d.
Public Boards					
Central Electricity:					
1955–60 (Civil Defence)	—	3	99½	..	3 0 4
1955–75	5	5	113½xd	..	4 8 0
1951–73	4½	4½	107	..	4 4 1
1963–93	3½	3½	102	..	3 8 8
1974–94	3½	3½	100	..	3 5 0
London Elec. Trans. Ltd.	2½	2½	97	..	2 11 3
London & Home Counties 1955–75	4½	4½	110	..	4 1 10
Lond.Pass.Trans.:					
A	4½	4½	117½	..	3 16 7
B	5	5	115½	..	4 6 7
C	2½	3	65	−1	4 12 4
WestMidlandsJ.E.A. 1948–68	5	5	109	..	4 11 9
Telegraph and Telephone					
Anglo-Am. Tel.:					
Pref.	6	6	116	..	5 3 4
Def.	1½	1½	27½	..	5 9 1
Anglo-Portuguese	8	8	24/-	..	6 13 4
Cable & Wireless:					
5½ Pref.	5½	5½	112	+½	4 18 3
Ord.	4	4	76	+1	5 5 3
CanadianMarconi	$1 Nil	4cts.	9/9	−3d.	—
Globe Tel. & Tel.:					
Ord.	8½*	5*	37/-	..	2 14 1
Pref.	6	6	28/-	..	4 5 9
Great Northern Tel. (£10)	Nil	Nil	24½	..	—
Inter. Tel. & Tel.	Nil	Nil	17	+1	—
Marconi-Marine	7½	7½	32/9	..	4 11 7
Oriental Tel. Ord.	16	10	45/-	..	—
Telephone Props.	6	Nil	14/6	..	—
Tele.Rentals (5/-)	10	10	10/9	..	4 13 0
Traction and Transport					
Anglo-Arg. Trans.:					
First Pref. (£5)	Nil	Nil	4/-	..	—
4% Inc.	Nil	Nil	11	..	—
Brit.Elec.Traction:					
Def. Ord.	45	45	1125	..	4 0 0
Pref. Ord.	8	8	175	..	4 11 5
Bristol Trams	10	10	51/-	..	3 18 6
Brazil Traction	$½	$1	29½	+1	—
Calcutta Trams	5½	6½	40/-	..	3 5 0
Cape Elec. Trams	5	6	24/-	−1/6	5 0 0
Lancs. Transport	10	10	44/3	..	4 10 4
Mexican Light:					
1st Bonds	5	5	107½	..	4 13 0
Rio 5% Bonds	5	5	105½	..	4 14 9
Southern Rly.:					
5% Prefd.	5	5	74½	−1½	6 14 3
5% Pref.	5	5	109½	−½	4 11 4
T. Tilling	10	10	55/-	..	3 12 9
West Riding	10	10	43/6	..	4 12 0

(*Continued on next page*)

* Dividends are paid free of Income Tax.

Company	Dividend Previous	Dividend Last	Middle Price Sept. 14	Rise or Fall	Yield p.c.
Equipment and Manufacturing					
			£ s. d.		
Aron. Elec. Ord. . .	7½	10	44/–	..	4 11 0
Assoc. Elec. :					
Ord.	10	10	50/–	..	4 0 0
Pref.	8	8	38/–	..	4 4 3
AutomaticTel.&Tel.	12½	12½	58/3	+9d.	4 6 0
Babcock & Wilcox	11	11	47/6	..	4 12 7
British Aluminium	10	10	49/–	–6d.	4 1 8
British Insul. Ord.	20	20	5⅛	–⅛	3 11 2
British Thermostat (5/-)	18½	18½	19/–	..	4 17 4
British Vac.Cleaner (5/–)	15	30	28/–	+6d.	5 7 1
Brush Ord. (5/–)	6	8	8/–	..	5 0 0
Burco (5/–) ..	15	15	15/9	+1/–	4 15 3
Callender's ..	15	20	5	..	4 0 0
ChlorideElec.Storage	15	15	82/6	..	3 13 0
Cole, E. K. (5/–)	7	10	25/–	–6d.	2 0 0
Consolidated Signal	17	24	5⅞	..	4 3 6
Cossor, A. C. (5/–)	7½*	10*	21/9	+⅛	2 0 9
Crabtree (10/–) ..	17½	17½	39/–	+6d.	4 9 9
Crompton Parkinson Ord. (5/–) ..	20	20	26/–	..	3 17 0
E.M.I. (10/–) ..	6	6	28/–	+1/–	2 2 10
Elec.Construction	10	12½	50/–	..	5 0 0
Enfield Cable Ord.	12½	12½	59/–	–3d.	4 4 9
English Electric	10	10	18/–	..	4 3 4
Ensign Lamps (5/–)	25	25	22/6	..	5 11 1
Ericsson Tel. (5/–)	22*	20*	53/9	+⅛	1 17 6
Ever Ready (5/–)	40	40	40/6	..	4 18 9
Falk Stadelmann	7½	7½	32/–	+1/–	4 13 9
Ferranti Pref. ..	7	7	29/6	..	4¾ 15 0
G.E.C. : Pref. ..	6½	6½	32/–	..	4 1 3
„ Ord. ..	17½	17½	90/–	..	3 17 8
Greenwood&Batley	15	15	42/6	+½	7 1 2
HallTelephone(10/–)	12½	12½	25/3	..	4 19 0
Henley's (5/–) ..	20	20	25/6	..	3 18 6
4½% Pref. ..	4½	4½	23/–	..	3 18 3
Hopkinsons ..	15	17½	63/6	..	5 10 3
India RubberPref.	5½	5½	22/–	..	5 0 0
Intl. Combustion	30	30	6½	..	4 17 10
Johnson & Phillips	15	15	70/–	..	4 5 9
Lancashire Dynamo	20	22½	92/9	..	4 17 0
Laurence,Scott(5/–)	15	12½	12/–	..	5 4 2
London Elec. Wire	7½	7½	32/6	+1/–	4 12 3
Mather & Platt .	10	10	52/6	+⅛	3 16 0
Metal Industries (B)	5	8	41/3	..	3 17 6
Met. Elec.Cable Pref.	5½	5½	21/3	..	5 3 6
Murex	20	20	5½	..	3 18 0
Pye Deferred (5/–)	25	25	25/	..	5 0 0
Revo (10/–) ..	17½	17½	38/9	..	4 10 3
Reyrolle ..	12½	12½	70/–	..	3 11 5
Siemens Ord. ..	7½	7½	33/9	+6d.	4 9 3
Strand Elec. (5/–)	4	7½	7/3	..	5 3 5
Switchgear & Cowans (5/–) ..	10	20	18/–	+2/–	5 11 1
T.C.C. (10/–) ..	5	5	20/–	+⅛	2 10 0
T.C. & M. ..	10	10	52/–	..	3 17 1
TelephoneMfg.(5/–)	9	9	12/–	+3d.	3 15 0
Thorn Elec. (5/–)	20	20	21/9	..	4 12 0
Tube Investments	20	20	93/–	..	4 6 2
Vactric (5/–) ..	Nil	Nil	14/–	..	—
Vickers (10/–) ..	10	10	19/6	..	5 2 7
WalsallConduits(4/-)	55	55	45/–	+9d.	4 17 7
Ward & Goldstone (5/–)	20	20	26/–	..	3 17 0
WestinghouseBrake	10	12½	66/3	..	3 15 6
West, Allen (5/–)	7½	7½	7/3	–3d.	5 3 5

* Dividends are paid free of Income Tax.

Stocks and Shares (*Continued from page* 388)

announced, at 15 per cent. for the year, and the 10 per cent. maximum preference dividend is repeated. Taxation is the principal cause of the falling-off in the company's profit, but the report refers to a small advance in the cost per unit, due to higher working costs occasioned by wartime conditions. The reduction is of no great account to a company so strongly fortified as the Victoria Falls & Transvaal Power in the matter of reserves and allocations. At the present price, the shares give a yield of about 3½ per cent. on the money. The price of the preference shares stands at 35s. These are entitled to 6 per cent. cumulative dividend with a further participation of 4 per cent. Ten per cent. has been paid for years past, but the position of the preference shares is obscure.

Reference has frequently been made to the fact that in 1948 the Governor-General may give two years' notice of intention to expropriate the Victoria Falls & Transvaal Power undertaking, and it is often asked whether, in the event of this taking place, the preference shares would receive more than their par value of 20s. The matter has been raised on many previous occasions. It is still in doubt. Some people maintain that if the company is expropriated in 1950, the preference shares will be paid off at their nominal value, while other opinion takes the view that the shares would be dealt with on the basis of the average Stock Exchange quotation over a period. Were it not for this doubt, the price of the shares would be standing decidedly higher than 35s.

Preference Shares and Yields

Globe Telegraph & Trust 6 per cent. preference shares have come on offer at 28s. 3d., returning at that price 4¼ per cent. on the money. This compares with £4 1s. per cent. obtainable from Cable Investment Trust 4½ per cent. preference at 22s. 3d. It is worth comparing these with Cable & Wireless 5½ per cent. preference stock, purchaseable at 113, which pays £4 17s. 3d. per cent. Such gilt-edged shares as Henley's 4½ per cent. preference return no more than 3¾ per cent. at 24s., at which price 500 are on offer. The same return is available from British Insulated 6 per cent. preference at 31s. 9d. A few thousand pounds Eastern Telegraph 4 per cent. irredeemable debenture stock is obtainable at 104, returning at that price £3 17s. per cent.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1*s. each*) *may be obtained from the Patent Office*, 25, *Southampton Buildings, London, W.C.*2.

AGA-BALTIC Radio Aktiebolag.—"Remote control systems." 11801/40. September 6th, 1939. (555476.)

Akt.-Ges. Brown, Boveri & Cie.—"Anode leads for high-voltage current rectifiers." 13710/41. November 11th, 1940. Addition to 555116.) (555509.)

Arrow Electric Switches, Ltd.—"Automatic electric circuit-breakers." 138/42. January 15th, 1941. (555511.) "Multiple electric circuit-breakers." 9084/43. January 15th, 1941. (Divided out of 555511.) (555537.)

Babcock & Wilcox, Ltd.—"Fusion welding." 2294/42. April 29th, 1941. (555495.)

L. F. Bentley & Pye, Ltd.—"Method and apparatus for heating material which has to be heated to perform a machining operation thereon." 2976. March 6th, 1942. (555516.)

Birmingham Electric Furnaces, Ltd., A. G. E. Robiette and P. F. Hancock.—"Preparation of gaseous atmospheres for use in heat-treatment furnaces." 5169. April 18th, 1942. (555592.)

British Thomson-Houston Co., Ltd.—"Compositions comprising cellulose derivatives." 13965/41. November 1st, 1940. (555444.) "Moulding compositions and methods of making the same." 1117/42. January 29th, 1941. (555449.) "Electromagnetic relays." 2139/42. February 18th, 1941. (555451.) "Ship propulsion systems and apparatus therefor." 7253/42. May 31st, 1941. (555549.) "Sealing or packing means particularly for refrigerators." 13227/42. September 20th, 1941. (555566.) "Protective electrical interlocking systems." 18515/42. January 3rd, 1942. (555603.)

British Thomson-Houston Co., Ltd. (General Electric Co.).—"Electric dynamometers." 8604. June 23rd, 1942. (555554.) "High-frequency amplifiers utilising electron discharge devices." 12365. September 2nd, 1942. (Addition to 534531.) (555601.)

British Thomson-Houston Co., Ltd., and K. R. Hopkirk.—"Apparatus for measuring the phase and amplitude of mechanical vibrations." 5777. April 29th, 1942. (555595.)

Electroflo Meters Co., Ltd., and H. Tabor.—"Engine indicators, pressure recorders, and the like." 8362. June 18th, 1942. (555553.)

Foster Transformers & Switchgear, Ltd., E. M. Pendrill and R. E. Jennings.—"Regulation of alternating current circuits." 2728. March 2nd, 1942. (555589.)

Igranic Electric Co., Ltd.—"Crane limit switches." 3204/42. September 20th, 1941. (555463.)

Kolster-Brandes, Ltd., and A. B. Atkinson.—"Tone control arrangements for radio receivers." 2275. February 20th, 1942. (555491.)

E. Le L. Lamb, E. K. Smith and Metropolitan-Vickers Electrical Co., Ltd.—"Protective arrangements for mine hoists." 3224. March 11th, 1942. (555518.)

Landis & Gyr Soc. Anon.—"Maximum demand meter." 13569/42. October 24th, 1941. (555567.)

G. Liebmann and Cathodeon, Ltd.—"Amplifying valve for high frequencies." 14914. November 20th, 1941. (555478.)

Marconi Wireless Telegraph Co., Ltd.—"Colour television." 12859/42. January 31st, 1941. (555565.)

Micanite & Insulators Co., Ltd., and M. S. Nevard.—"Manufacture of laminated paper and like tubes." 2485. February 25th, 1942. (555584.)

Philips Lamps, Ltd., and W. O. Julius.—"Electric supply circuits for electric welding apparatus." 5485. April 23rd, 1942. (555593.)

F. V. Primmett and R. L. Hine.—"Device for facilitating the removal of coverings from electric cables." 895. October 6th, 1942. (555448.)

A. Reyrolle & Co., Ltd., A. Rawling and I. W. A. Kirkwood.—"Apparatus for indicating and/or controlling the dielectric strength of an insulating gas." 2238. February 19th, 1942. (555453.)

P. Sadler and Metropolitan-Vickers Electrical Co., Ltd.—"Means for taking up slack in trailed flexibile leads or cables." 3980. March 25th, 1942. (555522.)

Sangamo Weston, Ltd., and A. H. Wickham.—"Price-change arrangements for coin-operated electricity or like meters." 2333. February 21st, 1942. (555512.)

B. Schwarz.—"Control of AC commutator motors." 882. January 21st, 1942. (555486.)

Siemens Bros. & Co., Ltd., and S. H. Moss.—"Connection of electrical networks." 16607. November 24th, 1942. (555473.)

Siemens Electric Lamps & Supplies, Ltd., J. N. Aldington and A. J. Meadowcroft.—"Electrode arrangements for electric-discharge lamps." 6092. May 6th, 1942. (555545.)

Standard Telephones & Cables, Ltd.—"Selective signalling system associated with a type-printing telegraph system." 9968/42. June 26th, 1941. (555458.) "Bridge stabilised oscillators for voice-frequency circuits." 4072/42. December 31st, 1940. (555523.) "Frequency modulation receivers." 4158/42. November 13th, 1940. (555526.) "Telephone subsets." 4175/42. January 24th, 1941. (555527.) "Electric resistor devices." 12136/42. August 30th, 1941. (555563.) "Machines for making stems for electric vacuum tubes and the like." 4068/42. March 29th, 1941. (555590.)

Standard Telephones & Cables, Ltd. (International Standard Electric Corporation).—"Telephone or similar system for establishing connections with a switching arrangement, comprising one or more stages with group selector switches." 4476. April 3rd, 1942. (555530.)

Standard Telephones & Cables, Ltd., and C. T. Scully.—"Amplifying arrangements for voltages, particularly for automatic volume control." 2277. February 20th, 1942. (555493.)

Standard Telephones & Cables, Ltd., P. K. Chatterjea and D. M. Ambrose.—"Circuit arrangements for separation of line and frame synchronising signals in a television receiver." 2276. February 20th, 1942. (555492.)

Westinghouse Electric International Co.—"Bearing lubrication." 3225/42. March 4th, 1941. (555519.)

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Dumfries.—September 24th. County Council. Electrical work incidental to the erection of rural houses in county. Schedules, etc., from and tenders to County Clerk, County Buildings.

Manchester.—September 24th. Fire-resistant covering of structural steelwork in substations. (September 10th.)

October 1st. Electricity Department. Modification of steam and water pipework to accommodate railway alterations. (See this issue.)

Orders Placed

Australia.—The following acceptances of tenders are recorded in recent issues of *Tenders* (Melbourne) :—

WESTERN AUSTRALIA.—Government Tender Board. 6,000-V, ironclad, compound-filled switchgear: Part I (approx. £33,076).—General Electric Co., Ltd. Part II (approx. £19,238).—English Electric Co., Ltd.

NEW SOUTH WALES.—Public Works Department. Fifty hand sirens (£1,000).—British G.E.C. Pty.

Sydney County Council. Storage batteries for Pyrmont power station. Spec. 677 (£2,493).—Tudor Accumulator Co., Ltd.

Birkenhead.—Electricity Committee. Accepted. Additional supply to Mersey Docks and Harbour Board: Rectifier. — Hewittic Electric Co. Switchboards.—W. Lucy & Co. E.h.v. switchgear.—Ferguson, Pailin.

London.—WESTMINSTER.—Contracts Committee. Accepted for six months. Electric lamps, cable, etc.—Stearn Electric Co.

Newcastle-on-Tyne.—City Council. Accepted. Electric cooking equipment installation at the new canteen at the Byker depot (£869).—G.E.C.

Southport.—Education Committee. Accepted. Rewiring and fixing communication bells at central school (£67).—Brooks & Southworth.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Bangor (North Wales).—Extensions to St. David's County Hospital for Caernarvonshire C.C.; W. Ll. Jones, county architect, county Buildings, Shirehall Street, Caernarvon.

Birkenhead. — Reconstruction, Palladium Cinema; W. M. & M. W. Shennan, architects.

Bollington.—Control centre and alterations to fire station for N.F.S.; C. A. Smith, surveyor, Council Offices, Bollington, near Macclesfield.

Bootle.—Rebuilding premises, Annie Road (£1,550); Marine & General Construction Co.

Brentford and Chiswick.—Establishment of school canteens; borough engineer, Town Hall, Chiswick, W.4.

Camelford (Cornwall).—Workers' houses (8), Michaelstow, Boscastle, St. Clether and Delabole, for R.D.C.; Andrew & Randell, architects, Hepworth Chambers, St. Austell.

Cheltenham. — Restaurant, Gainsborough Villas; borough engineer.

Finghall.—Farm workers' houses for Leyburn R.D.C.; Moody Bros., builders, East Road.

Gateshead.—Extensions to bakery, Team Valley Estate, for Hunters, Ltd.

Kidderminster.—Museum and art gallery; J. Hawcroft, borough surveyor, Mill Street.

Liverpool.—Wartime nursery, Derwent Road; city engineer, Municipal Buildings, Liverpool, 2.

Macclesfield.—Practical instruction centre and gymnasium, Athey Street Council School, for Education Committee; M. Tetlow, borough architect, Pear Tree House, Jordangate.

Manchester. — Civil Defence garage, Altrincham Road, Northen Etchells; G. Noel Hill, city architect, Town Hall.

Newcastle-on-Tyne. — School shelters. Contractors: R. M. Chamberlain & Co., Ltd., Gateshead, and T. E. Hill, Newcastle-on-Tyne.

Works kitchen; Nicholsons (Newcastle), Ltd., Depot Road.

North Riding.—Additions to wartime nursery, Normanby Road, South Bank (£1,500); county architect, County Hall, Northallerton.

North Westmorland.—Farm workers' houses for the R.D.C. Contractors: P. A. Bains & Sons, Kendal (8 houses), and R. Play, Penrith (10 houses).

Oldham.—Works canteen, Claremont Street; Bell Mill Co., Ltd., cotton spinners, Hathershaw.

Runcorn.—Headquarters, Halton, for local branch of British Legion; E. K. Gregory, president, British Legion, Halton.

Saltney.—Church on Lache estate; Rev. J. Phillips, The Vicarage, St. Mark's Church.

Sheffield.—Experimental houses, Manor estate; W. G. Davies, city architect, Town Hall.

Southport.—Hospital additions, Park Road; borough engineer.

Spennymoor.—Conversion of Low Spennymoor Parochial Hall into a British Restaurant; W. B. Marley, surveyor, U.D.C. offices.

Stourbridge.—New headquarters for local branch Y.W.C.A.; Miss Round, secretary.

Sunderland.—Erection of hutments at Plains Farm Junior School; education architect.

Rest room and first aid room at St. Luke's Road for the Sunderland Forge & Engineering Co., Ltd.; D. & J. Ranken, builders, Stockton Road.

Additions and alterations, Hanover Place, for Sir James Laing & Sons; J. Carter & Sons, builders, Deptford Terrace.

Watford.—Seven-bay garage and three-bay hut, Popes Road, Abbots Langley, for R.D.C.; surveyor, 25, King Street, Watford.